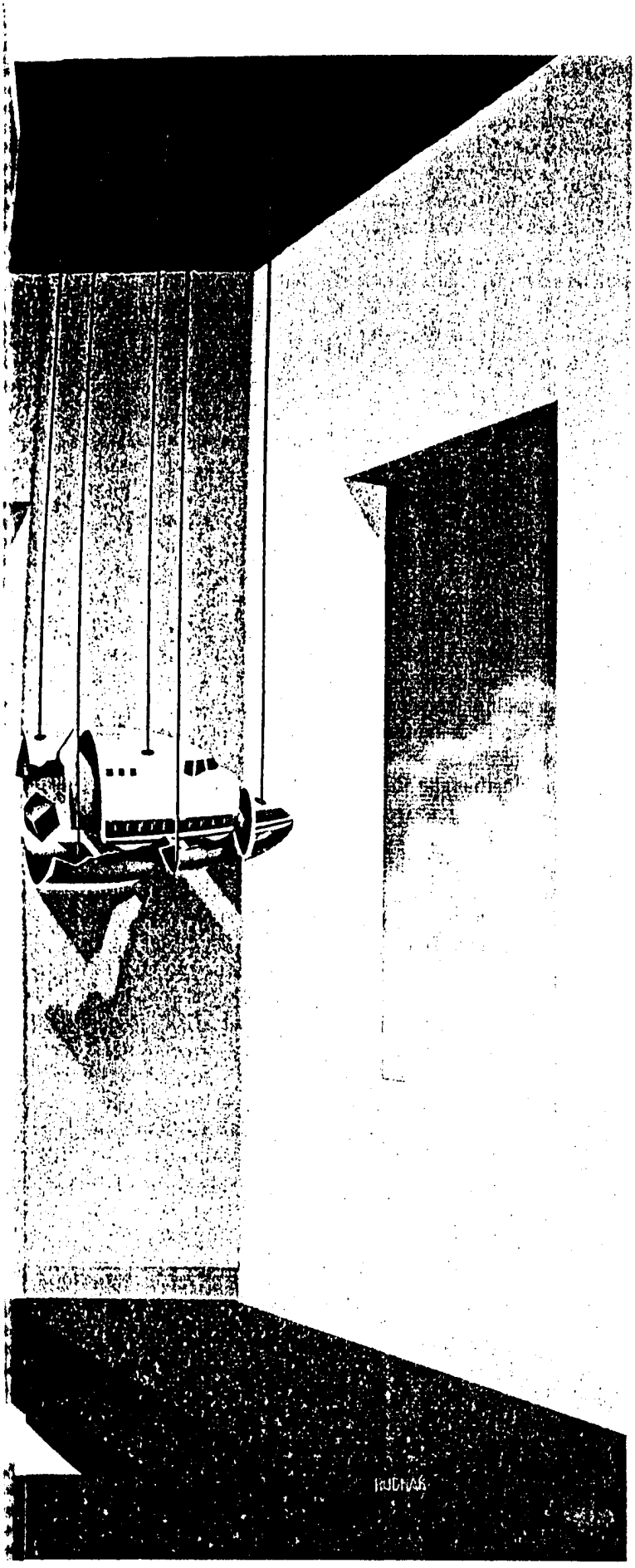


What really happened to Flight 007

"THE TARGET IS DESTROYED"

BY SEYMOUR M. HERSH

In Moscow

TODAY, THREE YEARS AFTER THE SOVIETS SHOT down Korean Air Lines Flight 007, killing all 269 people aboard, they remain convinced that some evidence somewhere will prove to the world that the airliner was sent over their skies by the Reagan Administration. In May of 1984, shortly after beginning research on Flight 007, I was granted permission to visit the Soviet Union and conduct interviews about it. My visit to Moscow culminated in a long meeting with Marshal Nikolai V. Ogarkov, the head of the Soviet General Staff, which oversees all Soviet military forces, and Deputy Foreign Minister Georgi M. Kornienko, in an ornate conference room belonging to the Defense Ministry. After five days of interviews and briefings, I had been provided with no evidence to support the thesis—which Ogarkov and Kornienko seemed to believe—that Flight 007 was a deliberate provocation. I raised what seemed to be obvious questions. Why not simply tell the world, "We made a mistake and shot down the airliner in the belief that it was an American reconnaissance plane"? Why say that it had to be a spy plane when there obviously was no proof?

Kornienko answered by telling me why I had been invited to Moscow: he and Ogarkov had agreed to my visa in the hope that they could persuade me, as a journalist, to investigate the Central Intelligence Agency's role in the shootdown. Taken aback, but realizing that the two senior Soviet officials were serious, I asked Kornienko with a laugh whether he was trying to be my editor. His response came in English: "Your assignment is to find that it was an intruder." The Deputy Foreign Minister added that the

This article is drawn from Mr. Hersh's book of the same name, which will be published this month by Random House.

American public would never accept the shootdown as a rational act on the Soviets' part unless it could be proved that the overflight of sensitive military installations was deliberate. I could not decide which was more surprising—his faith in the American First Amendment or the explicit acknowledgment that his government, for all of its public finger-pointing, had no evidence of American involvement in the flight path of the Korean airliner. Marshal Ogarkov said, "We do not know all the intentions that preceded Flight 007. I'm sure that the day will come when we know the reasons why this mission was arranged."

I spent the next two years investigating the very questions posed by Kornienko and Ogarkov, and found that Flight 007 was not on an intelligence-gathering mission for the CIA or any other agency of the United States or South Korea. But just why the plane ended up hundreds of miles off course may never be fully understood. How had the sophisticated navigational equipment on the Boeing 747, widely considered one of the safest planes in commercial use, failed to alert the crew? What did the Russians know about its going off course, and at what point did they know it? How did they mistake, as they insist they did, a commercial airliner for an American reconnaissance mission they had routinely monitored for more than twenty years? Why did they fail to shoot the plane down right away? What did United States intelligence agencies learn about the flight, and when? What basis did President Ronald Reagan and his top advisers have for publicly insisting that the Soviet Union had identified the plane as a commercial airliner before shooting it down?

I learned many new facts in my researches, and they make clear that the destruction of Flight 007 had its beginnings not in international intrigue but in the ordinary human failings of the Korean Air Lines crew members who were responsible for the lives of hundreds of innocent airline passengers.

Preparing for Departure

THE CAPTAIN OF KOREAN AIR LINES FLIGHT 007 ON the night of August 31–September 1, 1983, was Chun Byung-in, forty-five years old, who had been flying for KAL since 1972, after ten years of service in the Korean Air Force. He was highly regarded for his safety record and had been chosen as a backup pilot on three of South Korean President Chun Doo Hwan's state visits. Captain Chun had flown the North Pacific route between Anchorage and the Far East eighty-three times, including twenty-seven flights along R- specific route that Flight 007 had been assigned that night by the Anchorage Air Route Traffic Control Center. R-20 is fifty miles wide, like all North Pacific routes, and comes within twenty miles of Soviet air space along the Kamchatka Peninsula, about 450 miles from the Aleutian Islands. Captain Chun's copilot, Son Dong-Hwin, forty-seven years old, also had extensive experience in the North Pacific, having flown between Anchorage and Asia fifty-two times in his four years with KAL, while logging nearly 3,500 hours in Boeing 747s. He had flown R-20 only seventeen days earlier, one of thirty such trips he had made. The flight engineer, Kim Eui Dong, thirty-two years old, had traveled North Pacific routes forty-four times, including three trips in the previous year. This was to be his first trip along R-20. Captain Chun and his colleagues were well rested; another crew had flown the first leg of Flight 007, from New York City to Anchorage.

There was little reason for the experienced crew to look forward to its assignment. Piloting a modern jetliner is far less glamorous than is popularly perceived. Nearly all of the significant navigation would be done by the plane's inertial navigation system, which controlled the automatic pilot. The INS, which is amazingly accurate in point-to-point navigation, has taken much of the work out of flying—as well as much of the fun. The second leg of Flight 007 would take about eight hours and cover 4,100 miles, most of them over water, most of them in darkness. Even the fact that the flight plan called for the airliner, with its 240 passengers and twenty-nine crew members, to fly within fifty miles of the Soviet Union was routine.

The flight plan for Captain Chun's trip across the ocean that night, detailing the speed and altitude for the airliner en route to Seoul, had been drawn up in advance by computer. Many pilots routinely follow such a prepackaged plan; others, after checking weather and other flight conditions, modify the plan. Captain Chun made his own decision on what altitude to fly at. The plan called for the airliner to climb from its initial cruising altitude of 31,000 feet to 33,000 feet after about two hours of flight, when, it had been computed, enough fuel would have burned off to lighten the aircraft and enable it to fly more efficiently in the thinner and colder air. Yet the airliner did not request permission to reach that altitude until more than three hours had passed. A copy of the plan that Chun had seen, left on file at Korean Air's flight-operations office in Anchorage, was printed in the appendix to a later report investigating the flight. It showed jottings made by Captain Chun indicating that he had spent a few minutes before takeoff revising the flight plan. He apparently was seeking ways of making the flight more fuel-efficient and elected to delay the aircraft's climb to 33,000 feet. Chun reworked the data and concluded that it would be more efficient to delay the climb until more fuel had been burned off, lightening the plane.

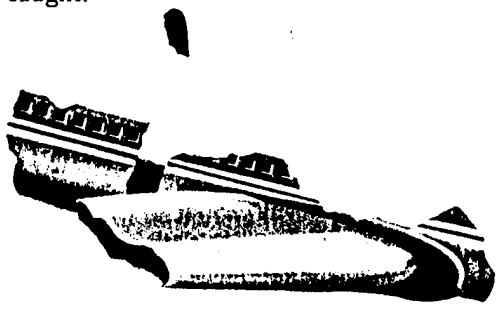
Chun's last-minute revision to the flight plan may have led him and his crew to rush through the other, more routine, preflight checks. For instance, there is evidence that

the Captain made a monumental error in computing the aircraft's weight and balance—the most important factor, as any pilot can attest, determining takeoff speed and distance. Other documents reproduced in the appendix to the same report showed that before departure Chun had signed a flight-release sheet listing the on-board fuel at 253,700 pounds. A few moments later he signed a weight-and-balance manifest incorrectly listing the fuel at 263,700 pounds (a later analysis of refueling records showed that the actual fuel on board at takeoff was 253,700 pounds). Under some circumstances an additional 10,000 pounds can mean the difference between a successful takeoff and a crash. For example, if the Captain was carrying 10,000 pounds more fuel than he realized, and if the aircraft was already at its maximum weight for takeoff—as many airliners are, but not Flight 007 that night—the miscalculation could have led to an aborted takeoff or a disaster.

IN THEORY, A CAPTAIN AND HIS CREW STRIVE NOT ONLY TO work together but also to reinforce each other and make it more difficult for significant mistakes to take place—such as the error in computing the amount of fuel aboard. In practice, the personal dynamics in the cockpit often make it difficult to correct errors—even potentially deadly ones.

The captain, invariably senior in experience and prestige, is king of the flight deck; copilots and flight engineers are reluctant to challenge his judgment and have been known to remain silent even when confronted with catastrophe. Not surprisingly, the captain's dominance is most pronounced among airlines in Asia, where elders and superiors are traditionally highly respected. Western crews are more willing to challenge their pilots, but in a crisis will also defer to a captain's orders, even when clearly dangerous. The cases most often cited include a March, 1977, runway collision of two 747s in the Canary Islands. The crash was triggered by a KLM captain who, despite a warning by his copilot, started to take off without clearance from the control tower. "Wait a minute, we do not have a clearance," the copilot said, according to the cockpit recorder. The captain paused as the copilot radioed the tower. He received no takeoff clearance, only navigation instructions. As the copilot was repeating those instructions to the captain, the captain suddenly exclaimed, in Dutch, "We're going—check thrust." The 747 then slammed into a taxiing Pan Am 747, killing 583 people, in the world's worst airline disaster. Similarly, in December of 1974, a Trans World Airlines jet crashed into a mountain near Dulles International Airport, outside Washington, D.C., when the captain decided that the air-traffic controller had cleared the plane for initial approach altitude, a predetermined height for approaching the runway. His copilot disagreed. A brief discussion ended with the captain abruptly cutting off his copilot and saying: "When he [the air controller] clears you, [expletive deleted], that means you can go to your. . . initial approach altitude." The captain was wrong.

The INS has not eliminated such behavior, nor could it have prevented the Canary Islands collision. But it has made it easier for crews with good working relationships to discover and rectify navigational mistakes. Of the twenty-one instances of significant INS malfunction and misprogramming referred to the Federal Aviation Administration's Aviation Safety Reporting System from 1978 to 1983, only one resulted in a deviation of 250 miles or more from the flight path. And none of the planes, until Flight 007, had crashed or intruded into hostile airspace. Investigators have determined that most of the errors were caught by crew members within moments, precisely as the system's manufacturers intended them to be. But the errors are not always caught.



The Flight Plan

THE INERTIAL NAVIGATION SYSTEM REPRESENTS A leap in technology. Navigation has always depended on outside points of reference, such as the stars or the magnetic North Pole or, more recently, radio beacons, to fix location and chart a course. The needs of space exploration changed all that. The National Aeronautics and Space Administration developed a new guidance device for its spacecraft—the inertial navigation system—that had immediate implications for commercial air traffic. The heart of an INS is a tiny platform inside the aircraft, stabilized by gyroscopes, from which it is constantly able to compute the airplane's position without reference to any outside point. The mechanism has the ability constantly to measure what is known as the earthrate precession—one of the measurable motions of the earth as it turns on its axis. The rate of precession varies with latitude, and the INS is capable at any given latitude of determining what it is. The INS not only computes its present position but senses any change in direction or speed; it therefore can navigate to any point on the earth by making simple computations. Flying over the North Pole, where magnetic distortion is severe, thus poses no special problem and calls for no special navigation by the crew. The INS is programmed always to fly the most direct route between two points, a segment of what is known as a Great Circle track (the term refers to the circle around the earth defined by the two points). As further assurance that the plane will remain on course, the INS constantly computes the effect of winds on the plane's course and feeds that information seven times a second to the plane's automatic pilot. This complex system has been in widespread use on airliners, including the fleet of Boeing 747s owned by Korean Air Lines, since the late 1970s.

One of the basic questions facing the initial investigators of the shootdown of Flight 007, an ad hoc team of experts assembled by the International Civil Aviation Organization—a Montreal-based group under the auspices of the United Nations—was whether the INS units aboard Flight 007 had been working properly. The ICAO investigation had been authorized as part of the resolution of condemnation of the Soviet action that had been overwhelmingly approved by the ICAO Council—after intense U.S. lobbying—on September 16, 1983. The investigators were given only until mid-December to complete their inquiry, and they turned to INS malfunction or misprogramming as the most logical place to begin to seek an answer to the essential problem posed by the shootdown: the failure of the seemingly competent Korean crew members to know they were lost. Sheer necessity was another reason for the ICAO team to turn to the INS: there was little else to work with. None of Flight 007's recorded communications with air-traffic controllers in Anchorage and Tokyo seemed out of the ordinary, and no apparent clues were found in the preflight logs and documents on file at Anchorage.

Most Boeing 747s have three INS units in the cockpit, one each for the captain, the copilot, and the flight engineer. On most flights, as on Flight 007, the captain's INS actually controls the autopilot and thus navigates the plane; the other units are backup. The devices are designed to be separately programmed and to cross-check one another—making it extremely difficult to go astray. And yet, as airline officials throughout the world describe it, the uncanny perfection of the INS has created a new generation of problems arising from the simple fact that there is little to do after takeoff and before landing except periodically monitor the instruments; complacency becomes almost inevitable. Pilots and the crew members of major international airlines have become experts in the seemingly simple business of staying awake and alert and not falling into the trap of flying by rote.

In the debate over what went wrong on Flight 007, many pilots and airline officials have argued that, even assuming that the airliner's INS malfunctioned or was incorrectly programmed, there were many other systems that should have warned the crew members that they were off course. The most obvious of those is the aircraft's ground-mapping radar, which has a range of 200 nautical miles and is displayed in front of both the pilot and the copilot. If Flight 007 had been on course, the radar would have shown nothing but water until the aircraft had flown beyond the Kamchatka Peninsula. Instead, Flight 007 flew directly over the land mass of Kamchatka for at least twenty-five minutes. Later, en route to Sakhalin Island, when the pilots should have been looking at the configuration of the northern Kurile Islands, there was nothing to see on radar, for the airliner was then over the vast Sea of Okhotsk. How could the crew have missed all that?

The fact is that many pilots do not rely on ground-mapping radar, because—given the competence of the INS—they don't believe that it will tell them anything they need to know, and when it does depict conflicting data, they frequently choose to believe that it is malfunctioning. Many airliner pilots have acknowledged to me in interviews that they pay little attention to the radar, but few were willing to be quoted. One exception is Harold H. Ewing, of Sumter, South Carolina, an airline captain who spent much of 1984 and 1985 independently investigating the flight path of the Korean airliner. Ewing has flown R-20 between Anchorage and the Far East repeatedly since 1980; in his view, a major function of ground-mapping radar on that route is "to tell you where the Kuriles are . . . to tell you if you're a little to the right [toward the Soviet Union]." He says, "You don't look down and see a hundred percent ground cover and figure that it's Kamchatka—no way. You figure the radar's screwed up again, which it is half the time. If you're not okay, you just assume the radar's wrong." For many pilots, Ewing claims, ground-mapping radar serves as "a confidence check." A government aviation expert expresses the same thought in a somewhat different way. Pilots, he says, will use ground-mapping radar until it begins to depict something out of the ordinary; "then they shut it down."

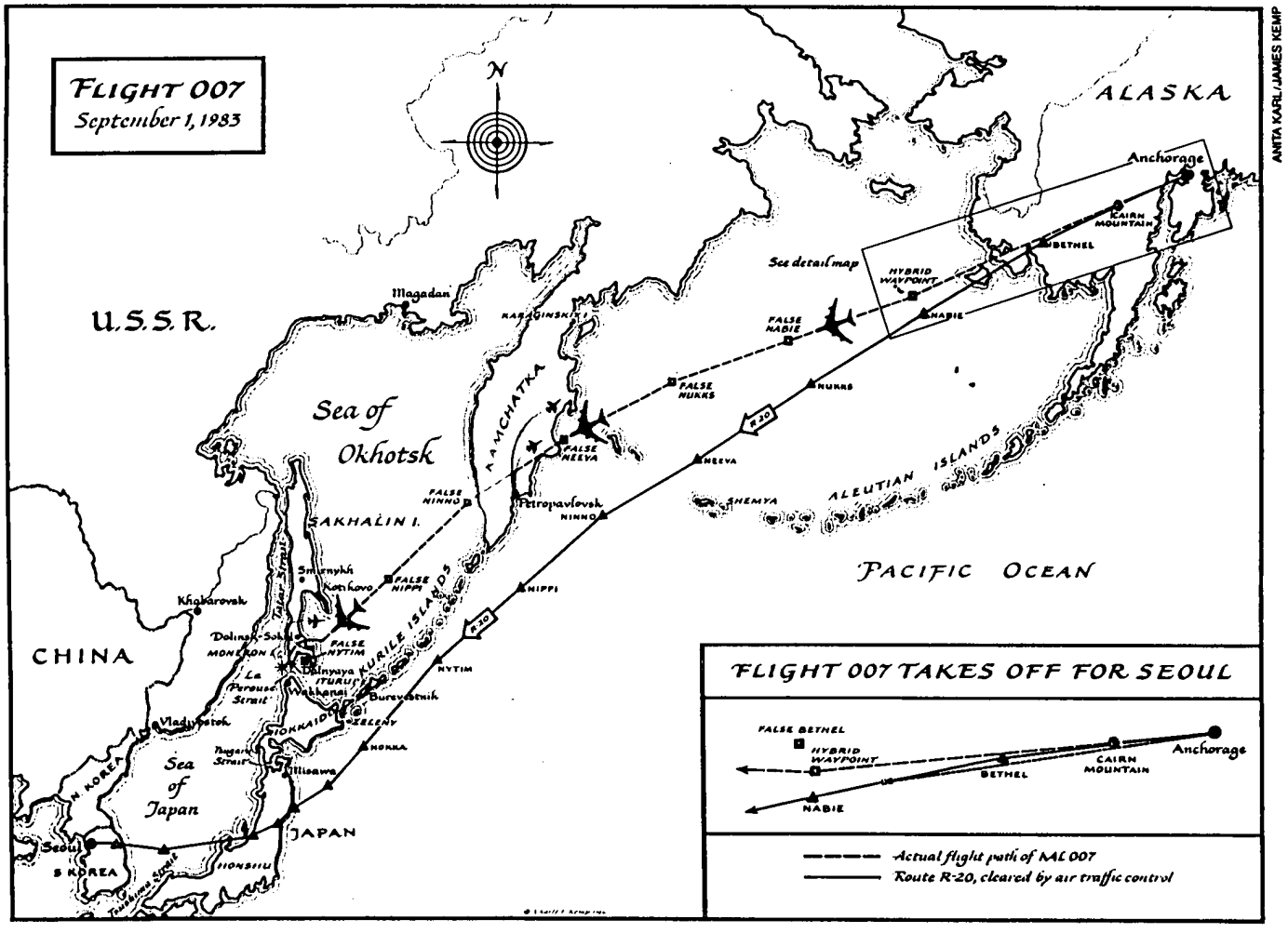
The accuracy of the internal navigation system depends on the accuracy of the navigational information supplied to it before takeoff. The copilot or flight engineer aboard a Boeing 747 is required by all airlines to enter the precise location of the plane into each of the three INS units separately, as the plane is sitting on the ramp awaiting passengers; any discrepancy in the information in the units would be sensed immediately and the INS's warning light would blink on. Next the crew member must enter the flight plan into the system. This is done with the help of what are known as waypoints, a series of navigational stepping-stones (on R-20 they are about forty-five minutes apart) that serve as guideposts for the INS during flight. INS errors usually begin here. The units can be "remote loaded": a crew member, after entering into the captain's INS the more than one hundred digits that represent the plane's navigational points, can select a remote-loading switch and automatically load the flight-plan waypoints into the other two units. Many airlines forbid remote loading, but pilots acknowledge that it goes on, largely because it saves a great deal of time in the busy moments before takeoff.

Only nine waypoints can be loaded at one time. This means that on extremely long flights the crew member must enter additional waypoints into the INS while in flight to keep the aircraft on course. (On the flight over the North Pacific to Seoul, which requires seventeen waypoints, he must enter eight additional waypoints.) The INS has two display points at the pilot's knee that always depict which waypoint is being flown from and which is being flown to. On many flights the crew member updates the INS units between the eighth and the ninth waypoint, when waypoints one through seven, which no longer have any navigational function, can be reprogrammed.

If the crew member mistakenly enters the seven new waypoints too early in the flight, say between waypoints seven and eight, the INS—finding itself suddenly directed to fly to waypoint eight from the new waypoint seven, which is thousands of miles ahead—will conclude that something is wrong. Under such conditions it is programmed to move forward to the next set of waypoints in the sequence—in this example, to waypoints eight and nine. The INS will direct the autopilot to pick up the Great Circle track, defined by waypoints eight and nine, at the point nearest the present position of the plane. On R-20 the new track would be just a few seconds—little more than a mile—to the north. Pilots in such situations on other routes have had their planes suddenly turn ninety degrees to fly to the new track and, upon reaching it, abruptly straighten out again to maintain it.

The present position of the aircraft while in flight is maintained in the INS as waypoint zero. The pilot has the ability at all times to instruct the INS to proceed directly from waypoint zero to any other waypoint. Pilots on late-night flights in the United States will often be cleared shortly after takeoff directly to their destination, from Los Angeles to Kansas City, for example, or to a waypoint more than halfway to their destination. The pilot in such a case simply directs the INS to fly from waypoint zero to the destination or the newly assigned waypoint, and the plane's autopilot bypasses the unnecessary waypoints en route.

Commercial pilots respect the complexity of the INS and, upon detecting in flight that the system was programmed with inaccurate coordinates before takeoff, will often jettison fuel and return to the initial airport ramp, or to any airport with a known position, to start all over again. The system is impossible to reprogram from scratch while in flight. Such costly and time-consuming interruptions have happened on Korean Air flights. An experienced accident investigator, William Hendricks, of the National Transportation Safety Board, an independent federal safety agency, together with another expert, Frank S. Del Gandio, of the Federal Aviation Administration, quietly flew to Seoul a few days after Flight 007 was shot down to assist Korean Air officials in their preliminary inquiry. The Americans learned from airline officials that in the six months preceding the disaster at least three KAL flights—from Honolulu, Paris, and Anchorage—had been aborted, and fuel jettisoned, in a series of misprogrammings. The airline's management in Seoul had responded to the aborted flights by placing its pilots on notice that there would be severe sanctions in case of future INS misprogramming. By the time they left Seoul, Del Gandio and Hendricks,



ANITA KARL/JAMES KEMP

who were later assigned as liaison officers to the ICAO investigatory team, were convinced that the crew of Flight 007 had disregarded company rules—and common sense—by not comparing all of the INS coordinates before takeoff with the entries in the original flight plan or, to avoid the possibility of typographical error, with the data in navigational charts. The two Americans told ICAO, an ICAO official says, that the Koreans "didn't know what they were doing."

The ICAO team, headed by M. Y. Wazirzada, of Pakistan, did not publish the unflattering information about Korean Air's prior INS problems in its final report, in deference to what was described as a general reluctance inside ICAO to criticize a member state's airline publicly. ICAO officials said that it would be wrong and unfair to conclude that the Korean Air crew on duty that night was part of an overall pattern of incompetence and lackadaisical flying by the airline. "At that point KAL was doing reasonably well," one senior ICAO official notes. "There were some horror stories being told, but you could find some in most airlines. It wasn't the best, but it wasn't the worst. Their crews were very well disciplined—perhaps too well."

TWO AND A HALF MONTHS AFTER THE SHOOTDOWN, operating in secrecy, ICAO assembled more than a dozen INS experts from industry and government at the Boeing Company's flight-crew training facilities in Seattle, to try to simulate the last flight of the Korean airliner. The tests were conducted with the aid of engineers from Boeing, the manufacturers of the 747, and from Litton Aero Products, whose INS may have malfunctioned or been misprogrammed. The ICAO effort was impeded by the refusal of the Soviet Union to supply its military-radar data on the flight of KAL 007. The United States, which had collected the same data by monitoring the Soviets, also did not turn it over. Such information would have revealed Flight 007's precise flight path over the Soviet Union.

The ICAO report was published in December of 1983 and, although hampered by severe time constraints and a reluctance to tell all that ICAO knew about Korean Air, remains the most comprehensive official investigation of the shootdown to date. The report presented five scenarios in an attempt to account for the navigational failure of Flight 007 and the plane's subsequent destruction over Sakhalin. In two of the scenarios the errant flight path approximates the one that Flight 007 is now believed to have followed.

One scenario suggests that the crew of Flight 007 failed to engage the INS at all and flew on a direct magnetic heading that would take the aircraft to Cairn Mountain, 170 miles southwest of Anchorage, on the Alaskan mainland; this route, if unchanged, would lead the plane close to Sakhalin Island, where it was shot down. This type of error, known to have happened on at least five other INS-equipped flights since 1978, centers on a switch in the cockpit that enables the crew to go back and forth among three different navigational systems that can be linked to the automatic pilot. Turning the switch farthest to the left activates the INS, the aircraft's main navigational mechanism and the system used most frequently on transoceanic flights. The next position is a magnetic heading mode, which allows the pilot to fly the plane in a straight line toward any compass heading he chooses. The third position enables the plane to respond to a radio beacon known as a VOR, for very-high-frequency omnidirectional radio range. A VOR consists of a scattered array of high-powered ground transmitters that emit thin radio beams known as radials. A pilot can set his course by choosing a series of VORs to fly along. There were several times in the early stages of Flight 007's final flight when the crew, if it had chosen to do so, could have tuned to a VOR—pilots call it capturing a radial—and discovered the navigational error.

In the magnetic-heading scenario, the ICAO investigators noted that Flight 007's initial course that night was toward Cairn Mountain. To get there, the crew could have set the switch to the heading mode and flown on a course of 246 degrees. The pilot ordinarily would couple the INS to the automatic pilot upon verifying that the system was on track—perhaps after reaching Cairn Mountain, the flight's first waypoint and the site of a radio beacon, or perhaps after flying to the tiny Alaskan fishing village of Bethel, the second waypoint, twenty-five minutes away, and the site of a VOR transmitter. According to the scenario, instead of switching to the INS the pilot mistakenly remained in the heading mode, continuing to fly to the southwest at a course of 246 degrees. That heading, the ICAO simulation showed, came close to duplicating the course of the flight but placed the airliner at least eighty miles farther south than it is known to have flown. The discrepancy is evidence that Flight 007 did not end in catastrophe because the crew simply forgot to move a switch one position to the left.

A more likely possibility is that the crew of the flight, in loading the aircraft's ground coordinates into Captain Chun's INS, which actually controlled the flight, inadvertently put in one wrong digit. If the position had been entered as W139 degrees instead of the correct W149 degrees, Flight 007's path would have been close to the one actually flown. Such misprogramming, which airline pilots call finger trouble, is known to have been the cause of at least four of the twenty-one INS programming errors reported to the FAA's Aviation Safety Reporting System.

An unavoidable problem facing the ICAO investigators was that there were no witnesses to what actually happened aboard the Korean airliner. Flight 007's crash site in the Sea of Japan had not been located and thus there was no possibility of recovering the plane's flight data and cockpit voice recorders, the so-called black boxes. Moreover, if the recorders were found, there would be no assurance—assuming that the Korean crew members did not deliberately plan to go off course—that the recorded information would solve the basic problem of how the airliner ended up where it did. Another problem was political pressure.

The inquiry was being closely watched by the United States and the Soviet Union, influential members of ICAO, and the international committee was reluctant to find itself in the middle of a controversy between the superpowers, especially since it had only a few months to prepare its study of the shootdown. In the final report, titled simply "Destruction of Korean Air Lines Boeing 747 Over Sea of Japan," the investigators emphasized facts. They presented extensive detail about the specific navigational and radio equipment aboard the flight, and included the full FAA transcripts of all Flight 007 pilot-to-air-controller exchanges as well.

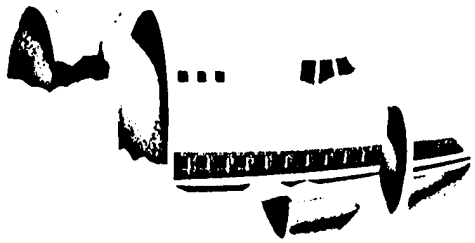
The report attracted only cursory attention from the media in the United States and elsewhere—people had already made up their minds about the shootdown—but some who did study the findings found them unpersuasive. For example, the ICAO report candidly noted a major flaw in its ten-degree-error scenario: such an error in programming Chun's INS would have brought Flight 007 thirty-eight miles north of course at the time it was supposed to fly over the village of Bethel, the second waypoint and the last on the Alaskan mainland. The airliner, as charted by radar, actually flew twelve miles north of Bethel. The report's critics argued that as gross an error as thirty-eight miles should have been easily noticed and corrected by the crew of Flight 007—if the flight had proceeded as the scenario suggested.

ICAO's council, always leery of disputes among members, agreed shortly after the report was submitted, in December, to have it reviewed by ICAO's Air Navigation Commission, its in-house experts. That study, published in February of 1984, acknowledged that the commission was "unable to establish the exact cause for the significant deviation from track." It further reported that the commission could not "validate and endorse" the ICAO simulations, because "any one of them contained some points which could not be explained satisfactorily." It explicitly said what had not been said in the earlier report—that the "magnitude of the diversion cannot be explained, particularly as the aircraft was equipped with navigation equipment which should have enabled the crew to adhere to its track."

The findings of the commission encouraged those critics in the United States and elsewhere who were convinced that the Reagan Administration was withholding information about the true mission of Flight 007. It also gave a few of ICAO's aviation experts, and a few international pilots as well, new motivation to continue working on what had become a haunting question: Why had the INS failed to warn the crew? Similar questions were being raised by the Soviet Union publicly and privately as part of its continuing campaign to fix blame for the shooting—and the loss of 269 lives—on the United States.

Harold Ewing, who by the time of the ICAO report was a virtual commuter between Alaska and the Far East on Boeing 747s over the North Pacific, remained perplexed by the many unanswered questions of Flight 007 and finally, late in 1984, decided to do something about them. He reviewed the ICAO data and then took it a step further while on his own flights: he began entering the waypoints given in the various scenarios into one of the backup INS units in the Boeing 747 he was flying. He was disturbed, he recalls, by the public's perception that the INS could not have been misprogrammed because of the system's redundancy checks. He knew better: "The INS is fraught with danger. It's not foolproof." After a year of on-the-job testing, Ewing was convinced that he had learned some of the answers to the saga of Flight 007, and he said as much in an unsolicited report that he forwarded to ICAO's Air Navigation Commission last fall. A senior ICAO official, speaking privately a few months later, described Ewing's account as the "most studious and comprehensive to date." Those at ICAO who still research the mystery of Flight 007 have incorporated many of Ewing's findings in their own informal scenario, which is constantly being updated.

What follows is a scenario, as devised by Ewing and elaborated upon unofficially by several aviation experts at ICAO, that explains what is known and what has not yet been revealed about Flight 007. It is consistent with information obtained and kept secret by American intelligence agencies—not known to Ewing or anyone at ICAO, but told to me during my research on Flight 007—about the exact flight path of the airliner just prior to the shootdown. It begins as the original ICAO scenarios did, with pilot error.



The Ewing Scenario

KOREAN AIR LINES RECORDS SHOW THAT THE FIRST crew member to enter the cockpit that morning was Kim Eui Dong, the flight engineer. It was his responsibility to activate the INS and to enter the aircraft's present position separately into each unit. This was one of the few periods during which the INS, with its built-in gyroscopes and its ability to function as an internal navigational point of reference, would be vulnerable to error. Kim Eui Dong began with Captain Chun's unit, which would control the autopilot during the flight, and it was at this point that he made the finger error—entering the runway ramp position as W139 degrees longitude instead of W149 degrees, which meant that as far as the plane's controlling INS was concerned, Flight 007 was 300 nautical miles to the east of the runway. If Kim had erred while entering the latitude, rather than the longitude, the INS would have caught the error. The system has an inherent ability, since it constantly measures the speed of the earth's rotation, to detect even small errors in latitude.

However, INS units are not sensitive to errors in longitude. (Ewing's scenario is consistent at this point with the ICAO scenario describing the ten-degree error.)

Once the computer running the captain's INS had accepted the information, the engineer switched the INS display to "desired track/status"—a step in determining the flight-readiness of the INS. The position coordinates were no longer displayed. Kim then put the correct coordinates into the copilot's INS and immediately got a warning—an amber light indicating that something was wrong. The computer in the copilot's INS had noted the difference between the W149 degrees correctly entered in its system and the W139 degrees in the captain's. Human nature then took over. The warning came while Kim was loading coordinates into the number-two INS. Therefore, he assumed—as many experienced members of a flight crew would—that his problem was somewhere in number two. It couldn't be number one; that INS was loaded and ready to go. The coordinates of the copilot's INS were digitally displayed for easy reading (as they had been on the captain's INS), and Kim checked the data that he had entered in the second INS against his worksheets. He saw that they were the same, and so he "cleared" the machine, merely pressing a button on the INS. He resolved the problem by getting rid of it: by turning off the warning light and leaving the error intact. There were precedents for his action; flight crews find that the INS's sensitivity to changes in latitude, or even to shifts or movements while a plane is awaiting servicing and passengers at the airport ramp, often makes the computer reject as inaccurate the correct coordinates for present position. A shift of only a few feet will make the INS go tilt. In such cases the crew members—faced with a choice of either clearing the system or reprogramming it—invariably clear the INS.

Kim now turned to the third INS, the one he was to monitor, and again entered the correct coordinates. There was no complaint from the number-three INS, because the INS's warning system was programmed, once cancelled, not to react to any further discrepancy among the INS units. Now all three units seemed to agree, although the captain's machine, which was going to fly the plane, was programmed incorrectly. The other two units did not have the ten-degree error.

By the time the pilot and copilot joined the flight engineer in the cockpit, about half an hour later, the INS was ready to accept waypoint coordinates, which are frequently entered by the copilot. The airline requires an elaborate procedure of cross-checking of both ground and waypoint coordinates. However, as FAA and ICAO officials acknowledge, such checking is not always done.

The entry of the first nine waypoints for a flight from Anchorage to Seoul is usually done prudently. Some U.S.-owned airlines insist that their crews list the plane's ramp position at the Anchorage airport or the VOR at Anchorage, six miles away, as the first waypoint in their flight plan. The goal is to verify immediately after takeoff the present position entered in the INS, and to verify the distance to the first waypoint. The Anchorage VOR was out of commission on August 31 for routine maintenance, a fact that had little impact on the planning for Flight 007, because many international pilots routinely use Cairn Mountain, to the southwest, as the first waypoint. Ewing's scenario uses Cairn Mountain as the first waypoint for Flight 007, an assumption described by ICAO officials as valid. Cairn Mountain and Bethel, the first two waypoints, had ground-based navigational aids that could be used to verify the accuracy of the INS programming. Once Flight 007 overflew Bethel, the final waypoint on the Alaskan mainland, verification would be much more difficult. For the next 2,500 miles Flight 007 would be flying over a series of artificially created waypoints in the North Pacific. These waypoints, about 300 miles apart, have been given a series of colorful, albeit meaningless, names—waypoints three through nine were called NABIE, NUKKS, NEEVA, NINNO, NIPPI, NYTIM, and NOKKA.

FLIGHT 007 TAXIED TO THE RUNWAY. ITS TAKEOFF, A MINUTE or so after 1:00 A.M., was uneventful. Less than two minutes later, as the airliner began to turn toward the southwest, the Anchorage control tower routinely told the plane to "proceed direct Bethel when able"—a shortcut in order to save time and perhaps some fuel. The airliner now should have been on a direct path for Bethel, flying from waypoint zero—present position—to waypoint two, bypassing the original waypoint one, Cairn Mountain.

At this point, according to the scenario, Captain Chun Byung-in switched to the INS mode without confirming that he was on course. Korean Air Lines flight rules forbid coupling the INS to the autopilot without a VOR fix, but with the Anchorage VOR out of commission, the Flight 007 crew, as most crews would do under the circumstances, committed a technical violation of the rule book in its handling of the INS. The VOR at Bethel would not be in range for at least another fifteen to twenty minutes.

The crew members, Ewing's scenario continues, should have received an immediate clue that something was wrong with the flight plan: the displayed distance to Bethel in Captain Chun's INS would have been not 350 miles or so but closer to 650 miles, the actual mileage plus the 300 miles added by the ten-degree error in programming.

Harold Ewing's goal was to take the INS misprogramming thesis, which he found credible, and rework it to see if it could be made to fit what he knew the actual flight path to have been. His basic theory was that Captain Chun, who was always interested—as his earlier modification of the flight plan had suggested—in flying efficiently and saving fuel, did much more than merely couple the INS system to the autopilot upon being cleared by the control tower to "proceed direct Bethel." Ewing's hypothesis about Captain Chun's next step is speculative, but Ewing and his supporters at ICAO believe it to be compatible with what happened: the Captain chose to enter a new second waypoint into his INS only, one bypassing Bethel. In other words, although he was cleared to go directly to

Bethel, he never went there. If he had set out to overfly Bethel, Ewing believes, it would have been difficult for him not to notice that the distance to go there, as displayed by the INS, was greater than it should have been. And even if he somehow missed that contradiction, he would have realized when he came abeam of the VOR—that is, when the VOR was ninety degrees to the left or right of the plane (in this case, to the left, or south)—that he was thirty-eight miles north of it. But he did not learn that he missed Bethel, because he never wanted to go there anyway. The Captain's new second waypoint was a navigational point 190 nautical miles to the southwest of Bethel, chosen because it seemed to be on a more direct line from his present position near Anchorage to a point on R-20 between Bethel and the third waypoint, NABIE, 658 miles from Anchorage. Flight 007's new route would save time and fuel, and it would not deviate significantly from the original flight plan as filed in Anchorage; any major deviation in the first twenty-five minutes of flight, when the airliner was still within radar range of Anchorage, would be noticed and would possibly generate reports.

Even if Chun had followed his new flight plan, it would not correspond to the actual route Flight 007 took, because the airliner did not go to the newly entered waypoint. Ewing's scenario says that Captain Chun made another programming mistake. Chun failed to change the original INS longitude coordinates for Bethel in the computer. (Latitude is always entered before longitude when a new waypoint is being programmed.) The longitudinal coordinates for Bethel remained for his new waypoint two—still ten degrees off, because of the original programming error. Flight 007 was now en route to the unknown—flying toward a new "hybrid" waypoint, as Ewing calls it. Ewing acknowledges that his scenario calls for a leap of faith at this point, but he notes that Captain Chun could have been interrupted while entering the new waypoint and might not have returned to the task of entering the longitudinal coordinates. Another possibility is that the INS simply refused to accept the longitude component; such a rejection of coordinates had happened before.

Ewing's scenario provides a flight model that is consistent with the known flight path; it provides specific theories about the poor performance of the crew; it posits, according to Ewing, "only a tragic lack of attention to detail while engaged in an unauthorized operation which, had the disaster not occurred, would have been considered a minor violation at most."

A KEY TO EWING'S HYPOTHESIS IS COCKPIT BEHAVIOR. IN the first weeks after the shootdown of Flight 007, ICAO investigators interviewed many pilots and officials of Korean Air, including the crew of Korean Air Flight 015, who were flying from Anchorage to Tokyo the same night and talked with the Flight 007 crew at least eight times. The investigators became convinced that the most significant event in the cockpit had taken place well before Flight 007 reached its initial cruising altitude of 31,000 feet, and perhaps soon after the passenger-seat-belt sign was turned off, at 10,000 feet. Captain Chun, having established the plane on what he believed was the flight path he wanted, left the routine monitoring and reporting of waypoints to his crew members. It was time to do what was required of him as a senior Korean Air officer: he moved back into the passenger section to greet the various dignitaries on board, including Representative Larry P. McDonald, the Democrat from Georgia who had been chairman of the John Birch Society. McDonald was to attend a commemoration of the signing thirty years earlier of the U.S.–South Korean mutual-defense treaty. There were also three off-duty Korean Air Lines captains and three other nonworking crew members in the first-class cabin, all being ferried to Seoul for new flight assignments. ICAO officials believe that the Captain spent much of the next five hours chatting away. He was not heard from again on the plane's radio, not even by the crew of Korean Air Flight 015, who would spend some time in the early morning relaying position reports from Flight 007, now out of normal communication range, to the Anchorage traffic-control center. The two Korean airliners, initially minutes apart but flying ever farther away from each other, were able to talk back and forth with ease throughout the night, although none of their conversations was recorded. It was the usual chitchat, the crew members of Flight 015 later told ICAO investigators, about future assignments, rest facilities in Anchorage, where to eat, and, of course, the boredom of flying all night over water. These conversations would certainly have involved Captain Chun if he had been in the cockpit.

Flight 007's crew would have found it difficult to challenge the Captain's jury-rigged flight path, if anyone had noticed it. Junior officers did not second-guess the pilot on Korean Air, particularly one as prestigious as Captain Chun Byung-in. American pilots who have served with Korean Air Force crews in the military agree that the crew would probably have acquiesced. "Those Korean copilots and second officers don't say boo," one American told me. "They just sit there like vegetables." The copilot and the flight engineer of an errant Korean Air 747 that struck a parked vehicle and burned upon landing at Seoul in November of 1980 are said to have remained in the burning aircraft at the order of the captain, who was later blamed for the crash. The order, which has never been reported in the press, was heard by another Korean Air pilot, who was traveling as a passenger and who raced into the cockpit to urge his two colleagues to flee. They chose to share their captain's shame and perished with him in the fire, along with twelve others.

There is every reason to believe that if Captain Chun had remained in the cockpit at least until the VOR at Bethel was passed, he would have uncovered the INS programming error. The newly entered coordinates in his INS should have placed Flight 007 about six miles south of Bethel en route to the new waypoint two; the aircraft instead flew twelve miles to the north of the village. Given the accuracy of the INS, the deviation should have warned

him that something was wrong. The captain's INS, with its initial ten-degree programming error, was still flying from waypoint zero to the new waypoint two when Bethel was passed. The copilot's and flight engineer's INS units, once abeam of Bethel, routinely noted its passing by shifting from waypoint two, Bethel, to the third waypoint, NABIE.

The crew must have noticed that they were twelve miles north of Bethel when they made their routine position and altitude report to the Anchorage Air Route Traffic Control Center. The report, made by the copilot, was cryptic, as such reports invariably are; he merely said, "Report Bethel," and proceeded to give the altitude and the estimated time of arrival at NABIE. By the time 007 passed north of Bethel, it was well out of radar range of the Anchorage Air Route Traffic Control Center, which nonetheless continued to monitor 007 by radio.

At any point after reprogramming his INS the Captain—had he been in the cockpit—could have noticed a discrepancy between the distance to go to what he thought was his new waypoint two and the distance to go as actually displayed by his INS, which, unbeknownst to any of the crew, was navigating to the new hybrid waypoint far to the north. The distance from Anchorage to what the Captain thought was his new waypoint was 528 miles; the actual distance to the hybrid waypoint was 637 miles, a discrepancy of 109 miles. The Captain's reprogramming of waypoint two masked the magnitude of the initial ten-degree programming error. If the Captain had chosen to fly directly to any other waypoint—NABIE, for instance—the displayed distance to go from Anchorage would have been wrong by approximately 300 miles because of the ten-degree error. Creating the hybrid waypoint reduced the discrepancy by two thirds at the point during the flight when the navigational error could most easily have been detected.

Other airline crews have made preflight programming errors similar to Flight Engineer Kim's, but they are quickly detected in most cases, because the crew sees that there is a discrepancy between the distance to go to the first waypoint as shown on their flight plan or navigation chart and the distance displayed on the INS to go to the first waypoint. Captain Chun, by picking a new waypoint and then misprogramming it or failing to observe that the INS had rejected one of its coordinates, significantly diminished the amount of discrepancy. More important, his new waypoint was not printed on his flight plan, and his navigation charts had no distance information to it. The Captain could not readily compare the distance to go on his flight plan with the distance to go displayed by his INS. He had lost his ability to cross-check distances—the ability that has saved other flights. Any alertness on the part of the crew would have been made all but useless by the Captain's personal detour.

The original flight plan called for the airliner to reach NABIE, the third waypoint, ninety minutes after takeoff. The plane would have arrived at the hybrid waypoint in ninety-three minutes—much longer than the trip to the Captain's new waypoint should have taken, because his failure to enter the longitude for it and the original ten-degree error made the plane fly 109 miles out of its way. The crew perhaps concluded that the Captain had simply programmed his INS directly to NABIE—that is, from waypoint zero to waypoint three—in the first moments after takeoff from Anchorage. The discrepancy of 109 miles would have meant little to the crew members, who would have known that the Captain had changed waypoints but not much else. Moreover, neither the copilot nor the flight engineer would dare ask for an explanation or question what the Captain did.

There was still another INS discrepancy, which the Captain, had he been in the cockpit the moment the hybrid waypoint was overflown, would have found hard to miss. The distance from the Captain's intended new waypoint to NABIE, the third waypoint, should have been displayed as 122 miles. The Captain assumed that the plane would fly from his new waypoint to NABIE. According to the scenario, it was instead en route for more than 300 miles from the hybrid waypoint to what Harold Ewing and ICAO officials call a "false NABIE"—a position far north of the third waypoint but considered by Captain Chun's INS to be NABIE. Because of the initial ten-degree programming error (in only the captain's INS), Flight 007 was now abeam of the real NABIE—ninety degrees to the side of and north of the waypoint. The INS computers were programmed to sense the passage of a waypoint even if the airliner was hundreds of miles to the north or south of it. Flight 007's second and third INS units, used by the copilot and the flight engineer, sensed correctly that they were abeam of NABIE and moved up to the next set of waypoints, from NABIE to NUKKS, the fourth waypoint in the North Pacific. But Chun's INS was still proceeding from the new waypoint two to the false NABIE, its third waypoint. Flight 007's inertial navigational system was now in total disarray, with the plane far off course and two of the INS units contradicting the third.

At this point, reassuringly, the actual distance from the hybrid waypoint to the false NABIE, to which Chun's INS was directing the airliner, was 303 miles, a distance very close to the 296 miles shown on navigation charts as that from NABIE to NUKKS. According to Ewing's scenario, this coincidence of distance to go would have helped to assuage any doubts that the crew members may have had: they knew they had passed a waypoint at just about the time the flight plan called for the airliner to pass NABIE, and if they had bothered to look they would have seen that the distance to go displayed on the captain's INS unit was very close to what the flight plan said was the distance to go to NUKKS.

As far as air-traffic officials at Anchorage could later determine, the copilot, Son Dong-Hwin, was busy with routine work during this early phase of the flight, although some of his reports were relayed through KAL 015—a common enough occurrence, since, as the ICAO investiga-

tion noted, "communication difficulties frequently arose" in many parts of the North Pacific. The copilot's reports consisted of little more than routine messages telling Anchorage that the flight had reached a waypoint, estimating when it would reach the next reporting point, and giving fuel, weather, and altitude information. The INS was essential to those reports. At each waypoint all three systems would flash a light to alert the crew that a waypoint had been reached. On other flights, with more complicated routes, the INS would automatically make any required turn at that moment. But R-20 was a continuum of evenly spaced waypoints needing only minor course adjustments. This quirk of geography may be another reason that the crew members did not notice that the aircraft was off course.

Another quirk of geography, according to Ewing's scenario, came into play after Flight 007 left the Alaskan mainland. The initial discrepancy of 300 miles that resulted from the ten-degree error in programming Chun's INS was roughly the same distance, give or take a few minutes of flying time, as that between the waypoints along R-20 across much of the North Pacific. And so, after the plane passed abeam of the real NABIE, this coincidence would ease any lingering concern—if there was any—that the copilot and the flight engineer might have had. All three INS computers' signals indicating that a waypoint had been passed would flash at nearly the same time. There would be no way for anyone but the most alert crew member to realize that the INS was going haywire.

Thus the copilot's and flight engineer's INS computers would continue to count waypoints in a sequence different from that of Chun's. Harold Ewing does not see any implication of unusually sloppy cockpit performance in a failure to discover this discrepancy. "No pilot I've talked to has ever actually checked, on any flight, whether or not all of the INSs were displaying the same waypoint selection, or ever thought it was necessary to do so," he says.

When the aircraft flew abeam of the fourth waypoint, NUKKS, Captain Chun's misprogrammed INS showed that it was over the third waypoint, NABIE. The other two INS units correctly noted the passing of the fourth waypoint and were programmed to move to the fifth waypoint,

NEEVA. Chun's INS continued to guide the airliner far to the north of R-20, toward the Kamchatka Peninsula and the flight path of an American RC-135 intelligence plane, code-named Cobra Ball, which operates out of a little-known Strategic Air Command base at Shemya, in the Aleutian archipelago of the North Pacific.

Cobra Ball

AIR FORCE MEN CALL SHEMYA "THE ROCK," AND FOR good reason: assignment to the tiny island in the far reaches of the Aleutians, 450 miles from the Kamchatka Peninsula, is equated with a tour of duty on Alcatraz. There are in fact few rocks on the island, which is geologically little more than a nine-mile-square sandpit halfway between Anchorage and Tokyo, containing barracks, a few operations buildings, an all-weather airstrip, and a vast antenna field. Shemya is bordered on the north by the Bering Sea, on the south by the Pacific Ocean; the result is seemingly constant high winds and overcast conditions.

The island became home to American B-29 bombers in the last year of the Second World War, and the base there has remained in operation since. It was converted in the early days of the Cold War into a secret military-intelligence base, whose main target was the Soviet Far East. In the early 1960s, with the development of land-based intercontinental ballistic-missile (ICBM) systems, Shemya took on additional importance. RC-135 reconnaissance aircraft (modified Boeing 707s) outfitted with high-resolution cameras and radar began operating from Shemya to monitor Soviet missile tests. These reconnaissance missions were given the code name Cobra Ball. The impact area for many of the Soviet warheads was on the Kamchatka Peninsula, an hour's flying time from Shemya; warheads also landed to the east, in the North Pacific, and to the west, in the Sea of Okhotsk, the large body of water between Kamchatka and the Soviet mainland.

Cobra Ball missions became an essential element in America's strategic intelligence over the years. At the same time, the need for the expensive and manpower-intensive monitoring of Soviet radar stations lessened with the advent of satellites. In the early 1970s there was an inevitable reassessment of how much meaningful information was being obtained from the ground-based operations at Shemya, and in 1975 it was decided to shut down the Army and Air Force intelligence sites on the island.

In 1983 Cobra Ball was still flying—more often than ever. At least ten missions a month were flown from Shemya that year, with the workload shared by the two RC-135 aircraft permanently on alert there. Each plane carries two sophisticated camera systems: a ballistic-framing camera that can photograph the re-entry of a Soviet nuclear warhead on five-inch film, and a medium-resolution system that records the wake of the re-entry vehicle, an essential factor in calibrating the size of the warhead. Cobra Ball also carries computerized receivers for intercepting, recording, and displaying the intelligence—dealing with such matters as speed, trajectory, and rate of fuel consumption—relayed by the ICBM and its re-entry vehicle to Soviet ground stations. Such signals are known as telemetry intelligence, or TELINT, and provide further data about the warhead weight, guidance systems, and accuracy of Soviet missiles. Cobra Ball is capable, for instance, of photographing the warheads flung from each Soviet re-entry vehicle and helping to determine their number and whether they could be directed to separate targets. Such information was critical to monitoring Soviet compliance with the SALT I and II agreements. The SALT II agreement set limits on the size of missiles and launchers and the number of missiles equipped with multiple warheads that each side could develop and deploy.

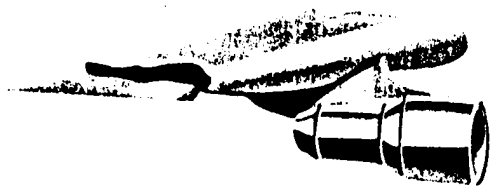
Cobra Ball depends on others to flush its quarry. For the system to work, the intelligence community must know when the Soviet Union is preparing to launch a missile test, and it must know far enough in advance to alert the Cobra Ball crews. Such alerts, known as tipoffs, are the responsibility of the highly secretive Defense Special Missile and Astronautics Center (DEFSMAC), operated at Fort Meade, Maryland, jointly by the National Security Agency and the Defense Intelligence Agency.

Cobra Ball's mission on the night of August 31 seemed no different from the hundreds before. The alert process began—as it had for many previous flights—at a secret intercept site at Vardø, a few miles from the Soviet border in the far north of Norway. There technicians from the Norwegian Intelligence Service picked up evidence of increased activity at Plesetsk, where the Soviets had been testing a new solid-fueled missile, the PL-5 (later designated the SS-25). The Norwegian report was quickly relayed to DEFSMAC, and officials there maneuvered a photo-reconnaissance satellite to overfly the area. The satellite's photographs, which were relayed instantly to Washington, confirmed the evidence of PL-5 activity, and the Cobra Ball crew on standby at Shemya was alerted—by the blaring of a klaxon—to take to the air.

Its mission would be to fly northwest from Shemya about 300 miles toward Karaginskiy Island, halfway up the Kamchatka Peninsula. The pilot would station the plane off the coast and begin loitering in a familiar pattern, slowly flying figure eights at an altitude of 29,000 feet or less, taking care to fly the loops closest to the Soviet Union with the plane turning away from land. Prudent navigation is a necessity, because the Soviets, like all coastal nations, have established an arbitrary zone off their coasts, known as the Air Defense Identification Zone, or ADIZ, that cannot be entered without prior notification.

Since the Soviets carefully track Cobra Ball, the ground rules for the flights call for extraordinary caution. If in-flight refueling is needed, the tanker aircraft is to fly beyond Soviet radar range. American intelligence officials have no desire to provoke the Soviets by having Cobra Ball and its refueler operate in the same area inside radar range. Such caution is necessary because the Soviet radars, known to NATO as Tall King, are not considered especially reliable in terms of differentiation—that is, they cannot provide accurate information on the height and size of a distant object. Often, while waiting for a Soviet test to take place, a Cobra Ball mission will circle in and out of the Soviet radar zone in its figure eights. Because of the U.S. planes' need to refuel and their occasionally erratic loops, Soviet radar operators have become accustomed to watching Cobra Ball fly in and out of radar coverage.

The Soviet Union, for reasons unknown, did not fire a missile on the night of August 31. Cobra Ball was told to come home early and did so. Men who have served aboard Cobra Ball missions recall that the usual procedure after being ordered to abort a mission is to turn for home, and do one final check of the various radio frequencies for signs of Soviet activity. If that is negative, it's "Miller time"—the crew slips off its headsets and relaxes. The pilot and crew of the Cobra Ball told Air Force intelligence officers twelve hours later that they had heard and seen nothing as they flew out of the range of Soviet radar, heading back to Shemya. They landed less than ten hours after takeoff, shortly after 2:00 A.M. Tokyo time, September 1.



The Soviet Trackers

PRECISELY WHAT HAPPENED INSIDE THE SOVIET AIR Defense Force will probably never be known, even if the Soviet military takes the unprecedented step of making available its internal reports on the incident. Soviet Air Defense, which is separate from the Soviet Air Force, is a vast network of interceptor aircraft, radar stations, and anti-aircraft weaponry, whose sole mission is to protect the national borders. Many American intelligence officials believe that the Soviet General Staff had trouble getting accurate information in the days following the shootdown—and still may not know all the facts. The head of the General Staff, Marshal Nikolai Ogarkov, at a highly unusual news conference in Moscow nine days after the shootdown (Soviet marshals almost never hold news conferences for Western reporters), reported that Soviet radar operators first noticed what they assumed to be an American reconnaissance plane at 12:51 A.M. Tokyo time. In his account the plane was tracked as it rendezvoused nine minutes later with a second American reconnaissance plane, which the Soviets had been tracking off the coast of Kamchatka for hours, assuming that it was carrying out another American intelligence mission. Ogarkov claimed that the two aircraft, in what Soviet analysts took to be a prearranged meeting, flew alongside each other for ten minutes, at roughly the same height and speed. One of the reconnaissance planes broke away to return to Shemya, while the other plane apparently headed southwest, straight toward Petropavlovsk, the largest city and most important installation on Kamchatka, where as many as thirty missile-firing submarines—half the Soviet fleet—were stationed.

At this point, Ogarkov told the press, "the conclusion was made at Soviet anti-aircraft command posts: An intelligence aircraft is approaching the Soviet Union's airspace. The suggestion arises: How can this be a question of a mistake in this case? It is perfectly evident that this aircraft's flight was being controlled, I would say precisely controlled. And therefore this flight was premeditated."

A very different explanation for the Soviet error in identification, however, was provided by Marshal Piotr S. Kirsanov, a former Air Defense commander in the Far East, during an interview with me at a military air base near Moscow in May of 1984. Kirsanov, who had left the Far East for an assignment in Moscow several weeks before the shootdown, said that his Air Defense experts had witnessed many rendezvous of American RC-135s in the international waters off Karaginskiy Island. "We know that the one-thirty-fives fly together for refueling purposes," he said. "In this particular case our specialists thought it was just refueling." Once one of the planes began to fly toward the Soviet mainland, Kirsanov said, it was "firmly fixed" as an RC-135. Moreover, before taking any direct action against the plane, the Air Defense commander at Kamchatka asked the local air-traffic control, which monitors civilian air traffic, whether it knew of any unscheduled or unaccounted-for military or civilian airplanes in the area. "It was late at night," Kirsanov said, "when it was unlikely that any military exercises were going on." After being told no, the Air Defense commander attempted to contact the plane on emergency frequencies, with no success. Four Soviet interceptors on alert, Kirsanov said, were "scrambled" (ordered to take off) as soon as the aircraft—still identified as an RC-135—crossed the border, but they got into the air too late to force down the intruder or destroy it.

Ogarkov and Kirsanov were wrong about the parallel flight over Kamchatka by Flight 007 and Cobra Ball, and either have chosen not to tell the whole story or were lied to by subordinates. American technicians searched through thousands of feet of National Security Agency recordings and files to re-create, to the extent possible, the Soviet radar tracking of both Cobra Ball and Flight 007 over Kamchatka that morning, and no such side-by-side

flying was found. Nor was there any refueling operation in the area. The American intelligence community, while disagreeing about some details, has categorically concluded that the regional Air Defense commander at Kamchatka merely watched what he assumed was an American reconnaissance plane approach the border a few minutes after 1:30 A.M. Tokyo time. The Soviet commander was convinced, despite the target aircraft's unusually high altitude and speed (which might not have been clearly indicated by his radars), that the plane was a second reconnaissance mission and would do what similar flights had done for years: stop short of the Soviet border and fly looping figure eights in international airspace, going in and out of Soviet radar range.

It was not until 1:37 A.M. that the four Soviet interceptors were scrambled, a delay that most American analysts believe was due not to prudence—as Kirsanov suggested in our interview—but to that mistaken assumption on the part of the regional commander. The Air Defense officers at Kamchatka must have panicked when Flight 007 did not turn away, as American reconnaissance planes always did, but instead raced—at a speed of more than eight miles a minute—southwest. It flew for thirty minutes or more past the offshore buffer zone, across the Kamchatka Peninsula, and into the Sea of Okhotsk, heading on a direct course for Sakhalin Island, a heavily fortified Soviet military outpost 500 miles to the south of Kamchatka. The NSA later monitored messages showing that the Soviet interceptors had been given incorrect coordinates by the Air Defense radar facility at Talinskaya Bay, a few miles northeast of Petropavlovsk. Even if the pilots had been scrambled more quickly, they would never have found their target in time to take any action against it.

THE CREW MEMBERS OF THE KOREAN AIRLINER SEEMED TO have no inkling of what was going on below. At 1:23 A.M. Tokyo time, as the plane was nearing the mainland at Kamchatka, Son, the co-pilot, tried to clear up his radio-transmission problems. He established contact with the International Flight Service Station at Anchorage and asked for a check of his assigned frequency. Communication was difficult; ICAO would later report that Anchorage could barely hear him. None of this could have been especially troubling to Flight 007's crew members. They knew that they could still communicate with Anchorage through their sister ship if necessary, and because they assumed that the flight was minutes away from NINNO, the sixth waypoint, and well on the way to waypoint NIPPI, they believed that soon control of the flight would be transferred to the aviation authorities at Tokyo, to whom they would report during the final leg. Once beyond NIPPI, Son would have to enter new waypoints into the INS to take the flight all the way to Seoul. There was nothing in Son's early-morning reports indicating any stress or concern.

There had to have been acute fear at the Soviet Air Defense headquarters on Kamchatka. What if this was a repeat of the 1978 fiasco, in which a Korean Air Lines passenger flight that the Soviets mistook for a military spy plane had been allowed to penetrate Soviet airspace over Murmansk? The plane had been shot at, with two killed and thirteen badly injured in a forced landing. Many of the Soviet officials involved, as the men at Kamchatka knew, had been demoted or transferred. Careers were on the line once again. By the time the Soviet interceptors were in the air and over Kamchatka, the fighters could do nothing but track the airliner as it moved into international airspace over the Sea of Okhotsk. The next penetration of Soviet airspace would be at Sakhalin Island, 500 miles to the south across the Sea of Okhotsk.

Incredibly, there is no evidence that the Soviet Air Defense unit at Kamchatka shared what information it had with its superiors at either the district command post at Khabarovsk, on the Soviet mainland 750 miles to the southwest, or the post at Sakhalin. One theory is that the Air Defense officials at Kamchatka delayed making their reports in the hope that the American reconnaissance plane would realize its mistake (if it was one) or end its mission (if it was one) and fly, unmolested, out of the area through the Sea of Okhotsk. If that was the outcome, the less said or reported the better. No command would be eager to volunteer details of having allowed a foreign plane to fly over restricted Soviet territory.

THE AMERICAN INTELLIGENCE AGENCIES WOULD DEBATE for many months after the shootdown just what had happened to the Soviet Air Defense Force. They agreed that Soviet radar technology and procedures were unreliable. The Soviet Air Defense Force was known to have repeatedly made identification errors in the past and had in fact mistakenly authorized the destruction of Soviet passenger airliners, with heavy loss of life.

The U.S. Air Force's Electronic Security Command, a military component of the National Security Agency, working through its intelligence-gathering sites, or "floor" stations, at Anchorage, Honolulu, and Misawa, Japan (Misawa is the most important station in the Far East), conducted exhaustive reviews in an effort to understand what had gone wrong inside the Soviet Air Defense Force. In the view of American ESC analysts, the Soviet radar operators at Kamchatka may well have been utilizing a standard tracking technique known as dead reckoning, which would have had the effect of complicating the already difficult procedure of sorting passerby from foe. These analysts believe that the Soviet radar technicians confused the radar track of Flight 007 with that of Cobra Ball, and that they assumed from that point on that they were dealing only with another American RC-135 reconnaissance plane. One Air Force officer who reviewed the intercepted Soviet radar data concluded that one of the Soviet Air Defense trackers "practice-tracked"—that is, used dead reckoning in an effort to guess where the American reconnaissance plane would re-enter the range of Soviet radar if it decided to do so. The American officer says that as Flight 007 moved into the Soviet radar zone for the first time, the So-

viet operator would have erased his practice track for Cobra Ball and replaced it with Flight 007, assigning the airliner (as American intelligence analysts believe he must under Soviet standard operating procedure) a separate track designation, but believing that he was still tracking the reconnaissance plane.

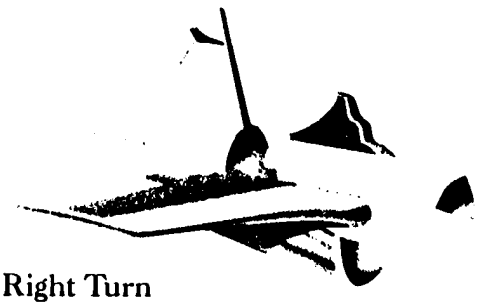
The National Security Agency presented a different explanation of the Soviet reaction in secret briefings to the Senate and House intelligence committees within two weeks of the shootdown. The NSA revealed that the Soviet radar operators had indeed reported to higher commands, as Ogarkov claimed at his news conference, that they were monitoring two aircraft tracks over the Kamchatka Peninsula. The NSA told Congress that the Soviets had tracked one of the aircraft—the Cobra Ball—as it flew back to Shemya. What the Soviets had done about the second plane, Flight 007, which they had also continued to monitor, the NSA said, was to make a leap of faith and simply assume it also was an American reconnaissance plane.

Congress was not told that the Soviet leap of faith was less irrational than it might have seemed. For years the United States has been routinely flying reconnaissance missions, called Rivet Joint missions, around the southern tip of Kamchatka and into the Sea of Okhotsk, a protected deployment area for the Soviets' missile submarines. The goal of such missions, like that of similar reconnaissance flights in Western Europe, is to monitor Soviet communications and Air Defense activities. The Rivet Joint flights, which operate out of Eielson Air Force Base, near Fairbanks, Alaska, approach Kamchatka from the northeast—much as Flight 007 did—and then, if not assigned to patrol in the Sea of Okhotsk, slide down the coast toward Sakhalin Island. Because there are more Soviet communications and more planes to monitor during the day, the vast majority of reconnaissance flights take place then—but not all. "We go there in odd hours every month or month and a half or so," one former Rivet Joint crew member recently recalled, "just to make sure that they aren't running exercises. A lot of times it's dead, but it's dead because of us. And sometimes we just walk into an exercise." On those few occasions when Cobra Ball and Rivet Joint have operated simultaneously off Kamchatka, they have been totally independent of each other. Yet both would be monitored by the Soviet Air Defense Force.

A senior Air Force intelligence officer recently speculated on the difficult decision that the Soviet Air Defense Force faced that night, assuming that it had identified the Cobra Ball flight and watched it turn back toward Shemya, only to be replaced by what Air Defense assumed was another American military plane. "The radar operators are young troops, inexperienced," the officer said. "There is at least one senior man on duty who has seen—or known of it through word of mouth—an R-J [Rivet Joint] and a Cobra Ball mission operating together. He provides the credibility and says, 'Hey, three months ago there was a joint mission.' They were never told of the possibility that it was a civilian plane."

The NSA and the Electronic Security Command have not been able to agree on whether the Soviet radio operators assumed that Flight 007 was the Cobra Ball re-entering radar coverage or a separate RC-135, on a Rivet Joint mission. But neither disputes that the Soviet Air Defense Force was convinced that it was dealing with an American reconnaissance plane—one whose flight path, whether it was a Cobra Ball or a Rivet Joint mission, they knew all too well. It was this certitude, American intelligence officials agree, that led to the Soviet decision not to challenge the aircraft as it began to drift closer to the Soviet mainland. There was little reason for Soviet Air Defense officials to become alarmed: the old days of American cross-border penetrations had ended in the early 1960s, with the advent of satellite intelligence. The American reconnaissance plane, they assumed, would turn aside.

Out of all this emerges a consensus that the Soviet military command system failed to respond appropriately to an unusual situation, thus dishonoring its top leadership. The panic and confusion among the various command elements, compounded by anxiety over future promotions, would have made it difficult for any officers who argued for caution to prevail. The Soviet failure would become much worse once Flight 007 reached Sakhalin.



The Right Turn

THE SEA OF OKHOTSK WAS NOT THE PLACE FOR A commercial passenger plane to have lost its way. The sea is the home waters of the Soviet Union's navy in the Far East. It is a strategic area, fundamental to the Soviet Union's perceptions of its responsibility and strength as a superpower: a refuge for ballistic-missile submarines capable of striking targets in the United States. The increasing skill of the United States and Japan in monitoring and tracking the Soviet submarine fleet in open waters has led the Soviets to withdraw some of their strategic submarines from patrols in the North Pacific and the Sea of Japan to the Sea of Okhotsk, where they are more protected.

The Soviets claim the sea as part of their sovereign territory and insist that foreign vessels seeking access obtain prior approval. Some officers in the U.S. Navy have advocated sending destroyers on patrol there to establish rights of transit as part of the Navy's "forward strategy," but the Reagan Administration has instead chosen to operate covertly. The area has become a focal point for American intelligence activities. Rivet Joint RC-135 missions routinely overfly it, as do the Navy's P-3 anti-submarine aircraft,

whose assignment is to keep track of Soviet underwater activity. America's most sophisticated high-altitude intelligence planes, U-2 Black Widows and SR-71 Blackbirds, also overfly the sea. Below the surface American submarines track Soviet submarines and monitor Soviet underwater communications.

AT 1:58 A.M. TOKYO TIME FLIGHT 007 LEFT SOVIET AIRSPACE above Kamchatka and flew into international airspace over the Sea of Okhotsk; its crew members were unaware that a group of Soviet fighters had previously failed by minutes to intercept the plane. There was still a chance, if the crew members could somehow discover their plight, for the airliner to turn to the east and avoid entering Soviet airspace again. At 2:08 A.M. the crew thought that NIPPI, the seventh waypoint, was being overflown; Captain Chun's INS was overflying what it thought to be NINNO, the sixth. Another routine position-and-weather report was due. Flight 007 should have been a little more than 1,800 nautical miles from Anchorage, and communication should have been easy. Once again, however, it was difficult for the off-course airliner to raise Anchorage. Son Dong-Hwin, unruffled by what he must have assumed was a routine communications glitch, sent the report to Tokyo air-traffic control instead. His next report would not have to be sent for eighty minutes, until 3:26 A.M., when he would be approaching what he thought was NOKKA, the ninth waypoint. Sometime before then, however, Son would need to enter new waypoints into the INS to navigate the flight to Seoul.

In its secret briefings to Congress the National Security Agency noted that the Soviets at Sakhalin first picked up Flight 007 at 2:44 A.M.; the radar at Burevestnik Air Field, on Iturup Island, in the Kuriles, detected it, along with at least two radars on Sakhalin, including the main facility at Yuzhno-Sakhalinsk. Flight 007 was then about 225 miles northeast of Sakhalin, still over the Sea of Okhotsk and traveling at eight miles a minute. The radar operators on Iturup and Sakhalin had an advantage over their colleagues at Kamchatka: they knew that what they were looking at was unusual. American reconnaissance planes routinely flew on an east-west track as they moved deeper into the Sea of Okhotsk. They had never been known to fly in a direct southwest heading, as Flight 007 was doing, into radar range of Sakhalin.

For the next thirty minutes Japanese and American intelligence stations in the far north of Japan collected evidence of the impending destruction of Flight 007. The information was collected in "real time," as the American intelligence community puts it, but it was not understood, or "analyzed," in time to warn Flight 007—in fact, not until more than four hours after the shootdown. At least one Soviet interceptor was airborne from Sakhalin by 2:56 A.M. Four planes, three SU-15s and a MiG-23, were monitored during the chase; two other MiGs, following Soviet procedure, flew at a much lower altitude and in radio silence, ready if needed. Nine minutes after takeoff one of the SU-15s began tracking its target on radar and, missiles at the ready, confirmed that it and the intruder were on the same heading.

It is not clear how far and how fast information traveled up the Soviet chain of command. The regional officials on Kamchatka, as well as those on Sakhalin, were obliged to report all significant radar data to the military district headquarters at Khabarovsk, 250 miles southwest of Sakhalin on the Soviet mainland. Under a reorganization of the Soviet military command structure which began in the late 1970s, the district commander at Khabarovsk directly controlled both the Soviet Air Force and the Air Defense units. His deputy for Air Defense was abruptly awakened by a duty officer and told that the regional Air Defense forces at Sakhalin had gone on alert. He was also informed about the scramble of interceptor planes at Kamchatka and the failure of the Air Defense Force there to make a positive identification of the intruder. Was anyone at Khabarovsk told about the events of Kamchatka before the first alerts from the radar sites on Sakhalin? Some NSA officials believe not. The commanders at Kamchatka had simply hoped that the intruder, once out of range of their radar, would disappear from Soviet airspace. The deputy commander for Air Defense at Khabarovsk had to decide what to do without knowing just what was heading toward Sakhalin. It would be inexcusable to destroy an innocent aircraft but far worse to fail to prevent an American intelligence plane from overflying militarily crucial territory. The deputy commander's thoughts must have turned to the first KAL incident, over Murmansk, and to the colleagues who had been relieved of their posts and had their careers ruined for allowing an unidentified airliner to penetrate the coast.

IN THE COCKPIT OF THE KOREAN AIRLINER IT WAS STILL yawn-and-stretch time. There was a final desultory conversation between Son Dong-Hwin and the men piloting the sister ship supposedly fifteen minutes behind on R-20. Crew members of Korean Air Flight 015 later told ICAO investigators that they initiated the chitchat at around three in the morning, when there were still three hours left to fly. "It's quiet," a Flight 015 crew member remembered saying. Son agreed, replying with equal banality that it was the strange time between night and day. "The sun will come up soon," he was quoted as saying. There was still no indication of the Captain's presence in the cockpit.

It was at this point, too, according to Harold Ewing's scenario, that Son decided to reprogram the aircraft's three INS units. His INS was showing that Flight 007 was en route from waypoint eight, NYTIM, to waypoint nine, NOKKA. Son knew that he could not replace waypoints eight and nine with new ones while he was still between them, but he could reprogram the seven already passed. He was concerned at this stage only with his INS, one of Flight 007's backup units. Once he had entered the seven new waypoints, he would do what had been done on scores of previous flights—remote-load the new waypoints from

his INS into the other two units. The new waypoints would navigate Flight 007 to the Seoul airport.

No crew member could imagine how fouled up things were. It was now a few minutes after three, and Flight 007 was approaching the coast of Sakhalin. Captain Chun's INS was flying from what it thought was the seventh waypoint, NIPPI, to the eighth, NYTIM. Son, having finished the tedious task of entering the new waypoints into his INS, remote-loaded them into the other two units. Chun's INS was confronted with a new waypoint seven to fly from—the VOR navigational facility a few miles outside of Seoul, more than 1,500 miles ahead of its actual position. The new information was beyond toleration, and in such cases the INS was programmed to jump ahead automatically to the next set of waypoints—in this case from waypoint eight, NYTIM, to waypoint nine, NOKKA—and to fly between those points via the Great Circle route. Flight 007 began to turn right, to the northwest, as it searched out its new route. The shift in course put the plane on a flight path between two major Soviet air bases—Smirnykh, in the center of Sakhalin, home of a MiG-23 regiment, and Dolinsk-Sokol, in southern Sakhalin, where a regiment of SU-15s was stationed. The senior Air Defense officials at Sakhalin must have concluded that the plane had turned deliberately, to avoid flying directly over the extensive anti-aircraft-missile installations that protected both air bases.

Son was caught unawares by the turn, which began just after he remote-loaded the INS. It took him at least forty-five seconds, according to the scenario devised by Harold Ewing, to observe what was going on and to react. Still, there was no cause for alarm. Mistakes in reprogramming INS waypoints happened often enough and were invariably recognized for what they were. The pilot would either immediately reprogram the INS to fly the plane from present position to the next waypoint or take the wheel himself for a few moments to guide the plane gently back to the proper course, taking care not to disturb sleeping passengers.

Harold Ewing's scenario—speculative as it may be—melds perfectly with the Korean Air flight-path information collected by American intelligence (to which Ewing did not have access). The Air Force's Electronic Security Command floor station at Misawa monitored at least three major Soviet radar sites as Soviet operators tracked Flight 007 through its last-minute change in course early that morning. The Soviet Union, in its public statements and in subsequently published maps and charts, depicted Flight 007 as making a sharp turn, of more than fifty degrees, to the right just before reaching Sakhalin, and then turning back toward its original heading until its destruction, at 3:26 A.M. The Electronic Security Command's monitoring of the Soviet radar tracking produced a flight path that was more consistent with Ewing's scenario; it showed a far more gradual turn—"more of a jog, really," as one intelligence analyst puts it. "Not a dramatic curve," another says. The American data are believed to depict the airliner's flight path more accurately than the chart re-created by the Soviets, simply because the Soviet General Staff was forced to rely on the personal recollections of its radar operators. The Soviets do not keep videotapes of what their radars pick up, as the NSA does.

The Soviet interceptor pilots assigned to Sakhalin were old hands; they had scrambled hundreds of times in exercises or to check out RC-135 Rivet Joint missions from Okinawa as they flew east of Japan and passed Sakhalin en route to the Sea of Okhotsk. One of the SU-15 pilots calmly reported at 3:06 A.M., twenty minutes before the shootdown, that he was flying behind the intruder. He was about eighty miles from the coast. The interceptor pilot could not see the airliner but understood from his ground controller that his target plane was turning to the right. He apparently found this hard to believe, because the Soviet mainland lay to the right—it seemed to be the last direction in which an enemy plane would attempt to flee. "Repeat the course," he said to his controller. "To the left, probably? Not to the right." Sixteen seconds later the SU-15—apparently after a direct order from the ground controller—also turned to the right. At this point the pilot had to have been aware that this mission was different. Whatever doubts the pilot may have had (he later claimed publicly to have had none) disappeared once the intruder aircraft began what seemed to be its evasive turn.

Within the next sixty seconds, according to the Ewing scenario, the crew aboard Flight 007 responded to its INS problems and began guiding the airliner back to its original track, unintentionally heading for Vladivostok. At 3:09 the SU-15 pilot confirmed what must have been a radar report from his ground controller: "Yes, it has turned. . . . The target is eighty degrees to my left." Over the next four minutes the SU-15 pilot, apparently following standard Soviet interception techniques, sought to maneuver his plane closer to the target, in what seems to be an attempt to make a visual identification. At 3:12 he reported that he could "see it visually [apparently the aircraft's running lights] and on radar." A minute later the pilot announced to his ground controller that he was ready to fire if so ordered: "I see it. I'm locked into the target."

For the first time since Flight 007 had been observed on the Kamchatka radar, two and a half hours earlier, a Soviet military plane was in a position to take action against it. The SU-15 pilot was waiting for further instruction—prepared, of course, to pull the trigger if so ordered. But the pilot had spent thirteen years chasing down real and suspected intruders off the coast of Sakhalin and undoubtedly had announced many times to ground controllers that he was locked onto the target and ready to fire. He could not have been surprised that somebody down below was being cautious.

Ten seconds after announcing that he was locked onto the target, the pilot was ordered to make another attempt, by electronic means, to identify the intruder or, at least, to ensure that the target was not a Soviet military aircraft. The SU-15 was capable of making contact with other Sovi-

et planes by activating an electronic interrogator, which is standard equipment on most Soviet military aircraft. The device is known in aviation as an IFF, for "identification, friend or foe." If Flight 007 had been a Soviet military cargo plane, for example, its transponder would automatically have responded to the SU-15's IFF interrogation, thus ending any doubt as to its identity. The transponders on American and other nations' military aircraft operate on different frequencies and are not capable of responding to Soviet interrogation. Similarly, Soviet—and American—interceptors are equipped with lightweight ultra-high frequency (UHF) radio systems and cannot communicate with commercial airliners, whose radios transmit on high frequencies (HF) or very high frequencies (VHF).

All commercial airliners that fly the North Pacific routes near the Soviet Union are equipped with transponders that, upon interrogation, identify them as civilian. However, they respond not to interrogation by other planes but only to that by ground-based equipment known as secondary-surveillance radar, which is in widespread use in military and civilian installations around the world, including the Soviet Union. In a Boeing 747 these transponders, when interrogated, flash a green light in the cockpit. Pilots who have flown R-20, Harold Ewing among them, recall being occasionally interrogated while in flight along the coast of the Soviet Union. There is no evidence that any of the Soviet radar facilities on Kamchatka, Sakhalin, or the Kurile Islands did, in fact, interrogate Flight 007 and receive a response indicating that the aircraft was civilian. Even if the plane had been identified as civilian, as was the Korean airplane that was shot down over Murmansk in 1978, with two passenger deaths, that would not necessarily have prevented the Soviet Air Defense officials from concluding that they were dealing with a military intruder.

American intelligence officials consider the controller's call for a plane-to-plane IFF interrogation as a break with usual Soviet procedure for intercepting American reconnaissance aircraft and another indication that the Soviets were uncertain of the identity of the intruder aircraft. IFF was used, Americans believe, to assure Soviet Air Defense officials that they were not targeting one of their own.

Fourteen seconds after the SU-15 pilot reported a lack of IFF response, he told ground control that his weapons system was switched on. Flight 007 had by now returned to its original course. The SU-15, poised to fire if ordered, was in position and traveling fast enough, so its pilot told the ground controller, "I have [enough] speed. I don't need to turn on my afterburner."

It was now 3:15 A.M. The crew of Flight 007, still oblivious of the armed Soviet interceptors trailing behind, continued to proceed routinely. Son Dong-Hwin radioed Tokyo for permission to climb from 33,000 to 35,000 feet, in another stage of the fuel-saving maneuver that Chun had worked out before takeoff. A minute later, according to the chronology presented by the Soviet Union to the ICAO investigation, Flight 007 flew directly over the east coast of Sakhalin. The Soviet Air Defense officers had only a few minutes to decide what to do.

With the intruder aircraft not much more than ten minutes from the southwest corner of Sakhalin and international airspace, the ground controller apparently ordered the SU-15 pilot to try to signal the intruder and force him to land. There were some clouds and storm centers in the area, and it was difficult to see. Part of normal signaling procedure, which called for great caution, was to approach an intruder only with cover—that is, with at least a second interceptor flying above and to the left of the first, providing protection in case of hostile fire. But the Soviet scramble over Sakhalin continued to be chaotic and poorly coordinated. None of the SU-15's colleagues was in a position to help. The pilot would have to act by himself.

Shootdown

AT SOME POINT EARLIER IN THE DRAMA IN THE SKY above Sakhalin, the deputy for Air Defense at district headquarters at Khabarovsk decided that he could not order an intruder, even one believed to be an American military plane, to be shot down independent of higher authority. There would be severe repercussions. He attempted to reach Marshal Alexsandr I. Koldunov, in Moscow, the commander in chief of the Soviet Air Defense Force and a deputy minister of defense. It was after ten at night in Moscow. A special unit of the NSA that is targeted on transmissions to and from Soviet satellites later learned the specifics of the call through a combination of luck and skill—mostly luck.

Incredibly, as the NSA learned, the Soviet reorganization had left the deputy commander for Air Defense at Khabarovsk with no secure satellite voice link of his own to Moscow. In order to forward an urgent verbal message that needed encoding, he had to send an aide to another building ("across the street," as one NSA analyst described it to me), to Air Force headquarters, where the aide could arrange to talk in secret with the Soviet General Staff by using a prearranged call sign that activated the encoding system. The use of the Soviet encoding system is a model of simplicity. The two military units that need to communicate—in this case, Khabarovsk and Moscow—establish what amounts to an ordinary microwave telephone link, in this case via the Soviet satellite *Raduga*. Such communications are easily intercepted by the NSA's monitoring stations and satellites, as the Soviets know. At a designated moment the two officers activate a sophisticated encoding system and carry on their conversation. The Americans

monitoring the call, or, more likely, listening later to a tape recording of the call, as captured by satellite, are suddenly confronted with a form of encrypted speech that sounds like a buzz saw.

As it turned out, the *Raduga* satellite was in a decaying orbit when the men in Khabarovsk and Moscow needed to talk using the encoding system. The aide was desperate; nothing like this had happened before at such a critical moment. He tried the call sign at least three times before giving up and carrying on his conversation with Moscow in the clear—that is, uncoded. The message was straightforward, one analyst told me: "He obviously was under pressure to get a decision [from Moscow]. He wasn't going to shoot down an American aircraft without getting some authorization from higher headquarters. He knew he had a bogey"—an American military intruder.

The deputy commander's message got through to a duty officer at the Air Defense headquarters in Moscow, who—as would happen in America—promptly put the aide on hold. At this point the direct NSA intercept trail dwindles, because the duty officer, when he returned a moment later to the conversation, did manage to activate the encoding system. "The cipher signal snapped on," an NSA official says, "and some long-precedence [high-priority] message was sent" from Moscow to Khabarovsk. The NSA officials would not say anything further about the message.

Thus it is not known whether Marshal Koldunov or any of his personal deputies on the Air Defense Force staff in Moscow directly ordered the destruction of the intruder. There are some in the NSA who believe that the order to shoot may have originated with Colonel General Semenovsky, who was the duty officer that night at the Air Defense Force's command bunker and operations center at Kalinin, just north of Moscow, and who may have been alerted to the call from Khabarovsk.

What is known is that within minutes an urgent encoded message was sent from the deputy commander's office in Khabarovsk to the command center at the large Dolinsk-Sokal airfield in Sakhalin. According to an NSA official, "That's when the order to shoot came down." The message that Khabarovsk relayed to the regional Air Defense headquarters at Sakhalin was not categorical but pointedly reminded the officers in the field of a Soviet rule of engagement: the officers must make a visual identification of the intruder before shooting it down. The message from Khabarovsk (and perhaps Kalinin) also reviewed the question of which field commanders were authorized to give an order to fire.

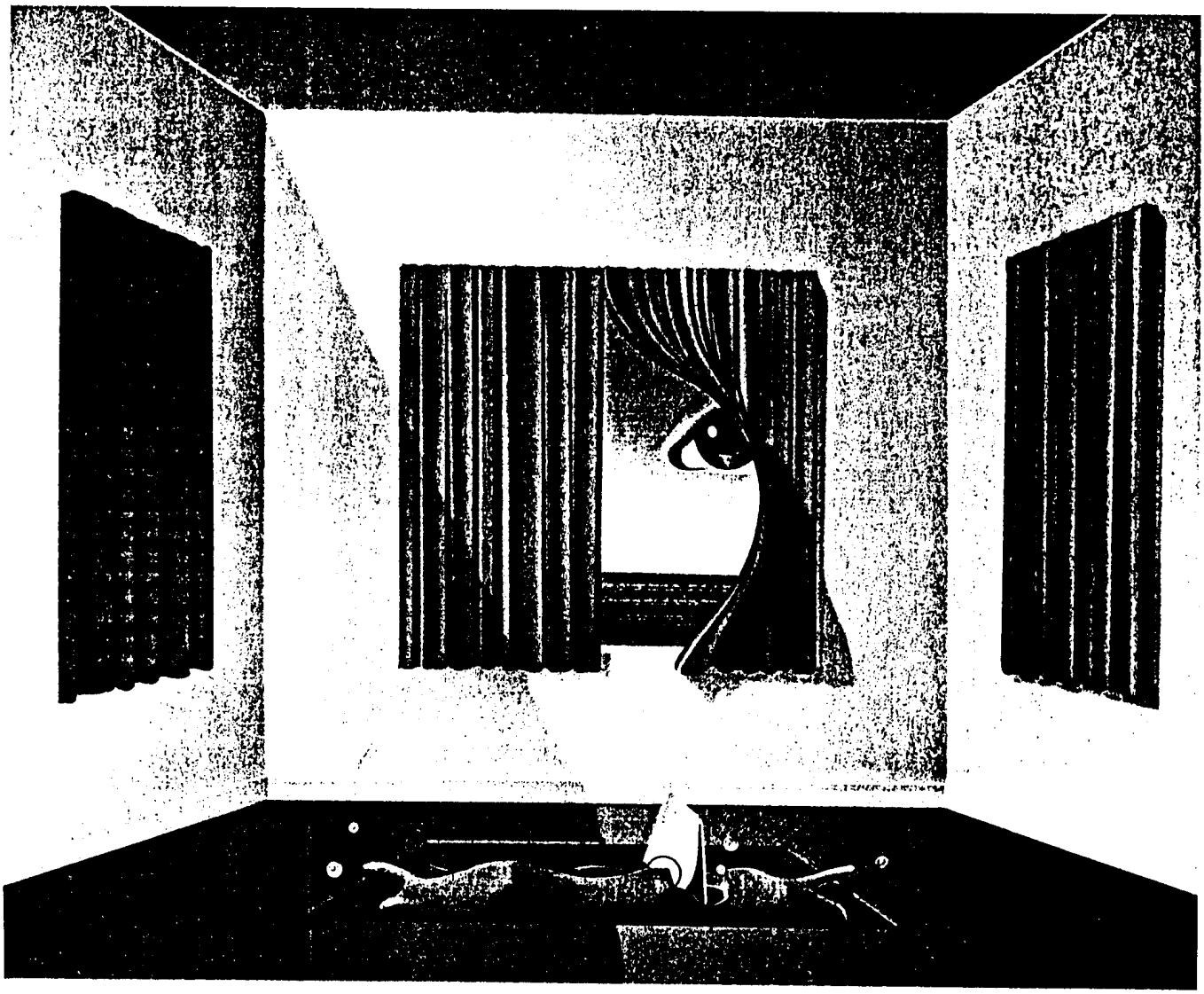
AT 3:17 THE PILOT OF THE SU-15 WAS CONTINUING TO PURsue Flight 007 over Sakhalin with his weapons system ready to fire. A fellow interceptor, one of the MiG-23s, made contact with him, relaying a question from a ground controller: "Do you see the target or not?" Apparently, the message from the deputy commander at Khabarovsk had gotten through. The SU-15 pilot asked, "Who's calling?" and then requested that the message be repeated. Thirty-six seconds passed before the SU-15 pilot reported once again that he could see the aircraft's flashing navigation lights. Merely seeing the navigation lights, of course, was not enough to identify the target. Thirty seconds later, at 3:19, he announced, "I am closing on the target. . . . I have enough time." During the last stages of the chase, according to a much reworked transcript that finally emerged at the NSA and has yet to be made public, the pilot reported that he could not see the target. It could not be learned at exactly what point in the final chase the remark, which apparently was not initially decipherable by NSA linguists, had been made.

At 3:20 the Soviet interceptor was ordered by his local commanders to make a final attempt to signal the intruder with cannon fire and, if unsuccessful, to shoot down the aircraft. "Oh, my God!" (*"Yolki palki!"*) the pilot exclaimed. He had spent thirteen years tracking American intelligence planes as an Air Defense Force officer in the Far East—thirteen years of chasing but never destroying. There was an inevitable camaraderie and respect for competence among the professional military aviators. The American officers piloting the RC-135 Rivet Joint or Cobra Ball missions often exchanged visual communications with the Soviets as the interceptor pilots flew by—usually just nods and smiles, but occasionally a *Playboy* magazine centerfold was held up for Soviet approval. Perhaps before the order came, the Soviet pilot had been preparing himself for yet another order to break off contact.

In the next sixty seconds the SU-15 drew much closer to the intruder and, following instructions from the ground controller, fired four bursts of cannon fire—120 shells in all, the Soviets later claimed—in a last-ditch attempt to attract the intruder's attention. At the time, according to later American analysis, the SU-15 was at least 3,000 feet below the intruder—a relative position it maintained throughout the chase. Military men agree that the shells, initially bright red, would have burned out before coming close enough to the airliner to be visible, and thus it would have been extremely difficult, if not impossible, for the Korean crew members to see them—even if the crew had been alert.

There is no evidence that they were. A moment earlier, just as the Soviet interceptor pilot was exclaiming "Oh, my God!" over his new orders, Tokyo radio had granted Flight 007 permission to climb to 35,000 feet. The Boeing 747 was climbing, with its nose pointed up, as the Soviet tracers flew by far below.

In beginning its climb, the huge airliner slowed up. The Soviet pilot had flown to within little more than a mile of the airliner to fire the cannons—the closest he had yet come to the airliner—and watched as the intruder, seemingly in response, began to climb. By 3:22 he angrily complained to his ground controller that the intruder's sudden slowdown had forced his high-speed craft to bolt past its target and that he had missed an opportunity to fire. He slowed down and began to fall back. The tension was acute. "It should have been earlier," he lamented, refer-



ring to the delay in issuing the shoot-to-kill order. "How can I chase it? I'm already abeam of the target"—that is, parallel with the airliner although still 3,000 or so feet below it. At 3:23 Son Dong-Hwin, ever dutiful, reported to Tokyo that the airliner had reached 35,000 feet. While Son was talking, the SU-15 pilot continued to fall back, and by 3:25 he was once again behind the intruder. "I am closing on the target, am in lock-on," he reported. There were no more course changes, and the pilot had little more to say to his ground controller. The mission was in his hands now. There was no hesitancy in the Soviet command system at this point, with the intruder only minutes from international waters. NSA intercepts show that at the last moment the Air Defense Force's most deadly anti-aircraft weapon, the SAM-5 surface-to-air missile, was placed on alert at Dalnyaya, the site of an extensive anti-aircraft battery on the southern tip of Sakhalin. Nothing further was monitored about that morning's demand from the deputy commander at Khabarovsk that the interceptor actually see the intruder before firing. Someone on Sakhalin took the rules into his own hands, and later paid with his job.

THE END CAME SWIFTLY. BETWEEN 3:26 AND 3:27 THE SOviet interceptor fired two air-to-air AA-3 ANAB missiles. Flight 007 was struck, and the SU-15 pilot reported, "The target is destroyed." One missile probably devastated the airliner's engines on the left wing; the subsequent explosion and fire undoubtedly damaged the fuselage. The second missile could have struck the rear of the plane, blowing out a bulkhead and immediately depressurizing the passenger cabin. There was confusion in the cockpit as the missiles struck and the crew members sought to understand what had happened; they literally didn't know what had hit them. No Mayday calls were made. Instead, forty seconds after the impact, Flight 007 radioed Tokyo air-traffic control a message, only a few words of which were intelligible: ". . . rapid compressions . . ." (decompression?) and ". . . descending to one zero thousand"—the standard emergency level of 10,000 feet, at which passengers can breathe depressurized air. Even at that moment there was nothing to suggest that they realized they had been struck by hostile fire.

Ironically, given the crew's lack of attention to so many

[redacted] during the flight, Son or whoever was at the helm of Flight 007 is credited by an American member of the ICAO investigation team with having performed professionally once under attack. The pilot, perhaps not realizing the extent of the damage, instinctively sought to make a turn and pull the aircraft away from and parallel to what he thought was the R-20 commercial flight track. "He did right," the investigator says. It didn't matter. Japanese radar trackings suggest that the Boeing 747, still partially under the pilot's control, made an emergency descent over the next eight minutes to about 16,000 feet. At that altitude the pilot may have tried to slow down the rate of descent, but the plane, by now depleted of hydraulic fluid, gyrated increasingly out of control for four more searing minutes. As it went into its final uncontrollable roll—perhaps it was on its back—the pilot, who may have throttled back on the remaining intact engines in an effort to slow down, had no choice but to use engine power in a last-ditch effort to regain enough control to avoid the inevitable. It was too late.

THE SENTENCE "THE TARGET IS DESTROYED"—WIDELY represented as a cry of triumph—would become a centerpiece in the initial press and television reporting on the shootdown of Flight 007. American signals-intelligence experts read much less into that phrase, however. They have overheard it for more than thirty years while monitoring Soviet training exercises. To a communications expert "The target is destroyed" means only that an enemy interception—whether real or simulated—has been brought to a successful end. "We hear it twenty times a day in training," one Electronic Security Command officer explains. "In this case the pilot saw something—an explosion—but it was not a confirmed kill." In the view of many intelligence experts, the SU-15 pilot might have been exultant when his missile struck the aircraft, but his statement "The target is destroyed" is faulty and incomplete evidence for any such conclusion, which simply may not be correct.

In fact the American and Japanese transcripts show that the Soviet interceptor pilot and two of his colleagues remained in the area for twenty minutes, apparently trying to confirm that the plane had indeed been destroyed. During that period they repeatedly asked one another about the location of "the target." At 3:32 A.M., for example, one of the MiG pilots accompanying the SU-15 asked, "What is the distance to the target?" Six minutes later the same pilot told his ground controller, "I don't see anything in this area. I just looked."

EACH SIDE FOUND SUPPORT FOR ITS ACTIONS CONcerning Flight 007. The Reagan Administration viewed the shootdown and the Soviet refusal to apologize for it as proof of the regime's essential brutality and indifference to human rights—and also as justification for its own hard-line policies. The Soviets continued to insist that the incident had been provoked by the United States and then distorted at the United Nations and elsewhere to slander their nation. They saw the American leaders as dishonorable men who could be counted on to manipulate the truth in a crisis.

The Soviets did not know that Secretary of State George P. Shultz, CIA Director William J. Casey, and Ronald Reagan had initially rushed to judgment over Flight 007—their strong hostility to communism had led them to conclude, on the basis of the first intelligence, that the Soviets had knowingly shot down a civilian airliner for intruding into their airspace. The Soviets—and the American people—also did not know something much more ominous: that Shultz, Casey, and Reagan chose to look the other way when better information became available about the Soviet confusion of Flight 007 with longstanding American reconnaissance missions. Those who ran the American government did not want to learn that the Soviets had been honestly confused and panic-stricken about the enemy intruder, and so they continued to believe what they wanted. They found it easy to agree that the American public could be told only that, as the White House Press Office repeatedly said, there was "irrefutable" intelligence showing that the Soviets had visually identified Flight 007 as a civilian airliner before destroying it. It was decided that the real story of the shootdown intelligence could not be told, not only because it was highly classified but also because it would raise doubts about all that the United States had said after the shootdown about the impossibility of mistaking Flight 007 for an American spy plane.

The full story, perhaps, would also diminish the widespread American anger toward the Soviet government that continued long after the destruction of Flight 007. That anger would be an obvious political asset in the 1984 elections. Twelve months after the shootdown, but only two months before the election, a mid-level State Department official was upbraided by the White House after volunteering, during a background press briefing, his opinion that the Soviet pilot did believe he was shooting down an American intelligence plane. The line between what had happened and what had not became blurred with time; what stood out after one year and continues to stand out today is a generally accepted belief that the Soviets, in their brutal fashion, deliberately shot down the Korean passenger airliner.

The Flight 007 accident demonstrates the importance of objective intelligence, objectively received, in a world where the concept of deterrence is predicated on the belief that the men with their fingers on the trigger have accurate information. Those in Washington who chose to increase international tension, and their counterparts in Moscow who responded in kind, were acting in ignorance of the facts. Flight 007 was a crisis made far more dangerous by the extent of misunderstanding and anti-Soviet feeling it engendered. And yet, for all of the outcry and misunderstanding, deliberate and otherwise, the shootdown did not increase international tensions to the flash point. The world may not be so lucky the next time. □