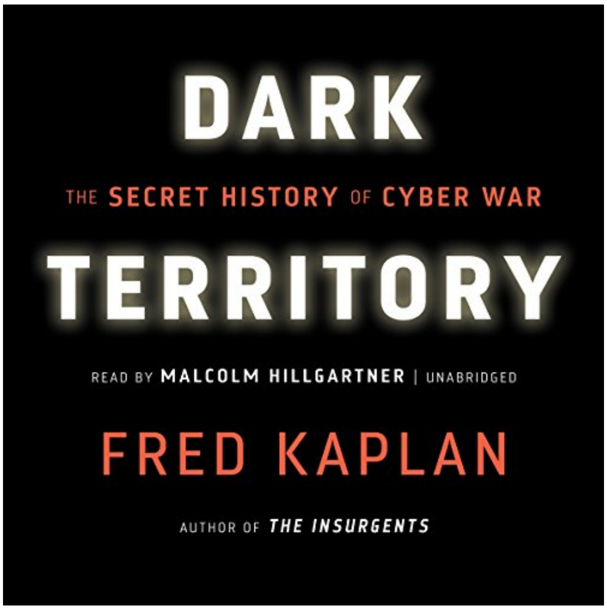
DARK TERRITORY: THE SECRET HISTORY OF CYBER WAR BY FRED KAPLAN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READ BY MALCOLM HILLGARTNER | UNABRIDGED
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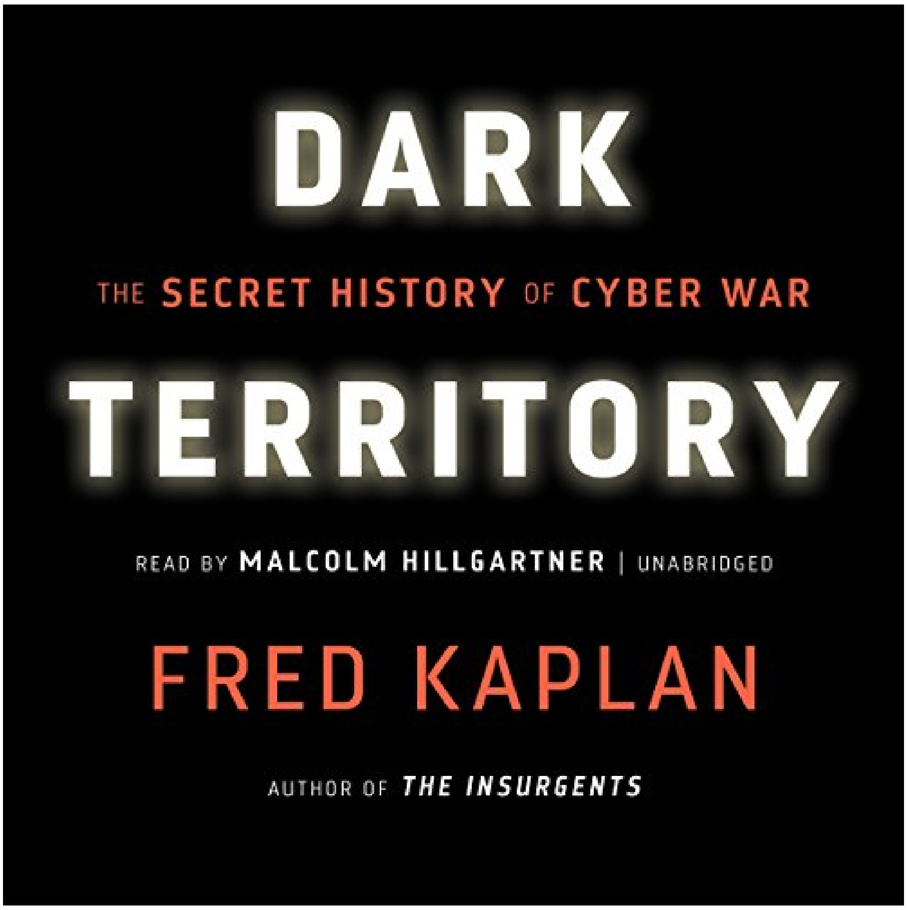
AUTHOR OF THE INSURGENTS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Review
"A compelling history of cyberwarfare." (Evan Osnos The New Yorker)

“A consistently eye-opening history of our government’s efforts to effectively manage our national security in the face of the largely open global communications network established by the World Wide Web. . . . The great strengths of Dark Territory . . . are the depth of its reporting and the breadth of its ambition. . . . The result is not just a page-turner but consistently surprising. . . . One of the most important themes that emerges from Mr. Kaplan’s nuanced narrative is the extent to which defense and offense are very much two sides of the same coin. . . . The biggest surprise of Dark Territory is the identity of the most prominent domestic heroes and villains in the “secret history.” . . . Dark Territory is the rare tome that leaves the reader feeling generally good about their civilian and military leadership.” (The New York Times)

“A book that grips, informs and alarms, finely researched and lucidly related.” (John le Carré)

“Comprehensively reported history . . . The book’s central question is how should we think about war, retaliation, and defense when our technologically advanced reliance on computers is also our greatest vulnerability?” (The New Yorker)

“Dark Territory captures the troubling but engrossing narrative of America’s struggle to both exploit the opportunities and defend against the risks of a new era of global cyber-insecurity. Assiduously and industriously reported. . . . Kaplan recapitulates one hack after another, building a portrait of bewildering systemic insecurity in the cyber domain. . . . One of the deep insights of Dark Territory is the historical understanding by both theorists and practitioners that cybersecurity is a dynamic game of offense and defense, each function oscillating in perpetual competition.” (The Washington Post)

Dark Territory offers thrilling insights into high-level politics, eccentric computer hackers and information warfare. In 15 chapters—some of them named after classified codenames and official (and unofficial) hacking exercises—Kaplan has encapsulated the past, present and future of cyber war. (The Financial Express)

“An important, disturbing, and gripping history arguing convincingly that, as of 2015, no defense exists against a resourceful cyberattack.” (Kirkus Reviews, starred review)

“Kaplan dives into a topic which could end up being just as transformational to national security affairs as the nuclear age was. The book opens fast and builds from there, providing insights from research that even professionals directly involved in cyber operations will not have gleaned. . . . You will love this book.” (Bob Gourley CTOvision.com)

“The best available history of the U.S. government’s secret use of both cyber spying, and efforts to use its computer prowess for more aggressive attacks. . . . Contains a number of fascinating, little-known stories about the National Security Agency and other secret units of the U.S. military and intelligence community. . . . An especially valuable addition to the debate.” (John Sipher Lawfare)

“Fascinating . . . To understand how deeply we have drifted into legally and politically uncharted waters, read Kaplan’s new book, Dark Territory: The Secret History of Cyber War.” (George F. Will The Washington Post)

"Fred Kaplan’s Dark Territory may become a classic reference for scholars and students seeking to understand the complicated people who ushered the United States into the cyber-conflict era and the tough decisions they made." (Rear Admiral Grace Hopper, Director, Center for Cyber Conflict, US Naval War College Proceedings of the U.S. Naval Institute)

“Deeply sourced. Luckily, he’s not slavishly loyal to his sources.” (Pittsburgh Post-Gazette)

EDITORS' CHOICE (New York Times Book Review)

“Chilling . . . Kaplan is one of America’s leading writers on national security, and his accounts of cyberattacks are gripping . . . assiduously researched.” (Edward Lucas The Times (London))

“Peppered with many fascinating behind-the-scenes anecdotes . . . A readable and informative history.” (P.W. Singer The New York Times Book Review)

A “Hot Type” Book Pick for March 2016 (Vanity Fair)

A “Hot Tech Book of 2016” (Tech Republic)

“Worthy of any spy thriller. . . a strong narrative flow . . . impressivelydetailed . . . deeplyrelevant . . . vital.” (The National (UAE))

“Jarring . . . a rich, behind-the-headlines history of our government’s efforts to make policy for the jaw-dropping vulnerabilities of our ever-increasing dependence on computers. . . . Kaplan renders a vivid account of the long struggle waged by presidents, bureaucrats, generals, private-sector CEOs, and privacy advocates . . . Kaplan enjoys considerable credibility in defense circles, but he guides us through the dark territory of cyber conflict with an omniscient-narrator voice reminiscent of Bob Woodward’s behind-the-scenes books. . . . Today, Kaplan argues, it is precisely U.S. pre-eminence in the network connectivity that makes us the most vulnerable target in the world to cyber sabotage.” (Washington Independent Review of Books)

“Pulitzer-prizewinning journalist Fred Kaplan’s taut, urgent history traces the dual trajectory of digital surveillance and intervention, and high-level US policy from the 1980s on.” (NATURE)

“Dark Territory is a remarkable piece of reporting. Fred Kaplan has illuminated not merely the profound vulnerabilities of our nation to cyber warfare, but why it has taken so long for our policy-makers to translate indifference into concern and concern into action. This is a vitally important book by a meticulous journalist.” (Ted Koppel, author of Lights Out: A Cyberattack, A Nation Unprepared, Surviving the Aftermath)

“A fascinating account of the people and organizations leading the way towards a cyber war future.” (Dorothy E. Denning, author of Information Warfare and Security, 1st Inductee, National Cyber Security Hall of Fame)

“A very in-depth work... its content is enlightening and intelligent and the secrets it uncovers are astounding.” (The News Hub)

“Everyone has heard the term 'cyber warfare.' Very few people could explain exactly what it means and why it matters. Dark Territory solves that problem with an account that is both fascinating and authoritative. Fred Kaplan has put the people, the technologies, the dramatic turning points, and the strategic and economic stakes together in a way no author has done before.” (James Fallows, national correspondent, The Atlantic)

“Chilling” (Haaretz)

“Revealing. . . . On a vital current-events topic, the well-connected Kaplan’s well-sourced history gives readers much to ponder.” (Booklist)

“One of the very best books ever written about the American military in the era of small wars . . . Fred Kaplan brings a formidable talent for writing intellectual history.” (The New York Review of Books)

“Excellent . . . An intellectual thriller.” (Time)

“Excellent . . . Poignant and timely . . . A good read, rich in texture and never less than wise.” (Foreign Policy)

“The best account to date of the history of cyber war…a human story: a history as revealed by the people involved in shaping it…full of detail, including information that will be new even to insiders.” (The Times Literary Supplement)

"It’s not easy to write an engaging book on cyberwar, and Kaplan, a national security columnist at Slate, has done an admirable job. He presents a clear account of the United States’ evolution into a formidable cyberpower, guiding the reader through a thicket of technical details and government acronyms." (Foreign Affairs)

About the Author
Fred Kaplan writes the War Stories column in Slate. He's also written about national security for the Atlantic, New York Times, New Yorker, New Republic, and others. He has a PhD from MIT and spent decades covering the Pentagon as a Pulitzer Prize-winning reporter. He lives in Brooklyn with his two daughters and his wife, NPR host Brooke Gladstone.

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Dark Territory CHAPTER 1 “COULD SOMETHING LIKE THIS REALLY HAPPEN?”
IT was Saturday, June 4, 1983, and President Ronald Reagan spent the day at Camp David, relaxing, reading some papers, then, after dinner, settling in, as he often did, to watch a movie. That night’s feature was

WarGames, starring Matthew Broderick as a tech-whiz teenager who unwittingly hacks into the main computer at NORAD, the North American Aerospace Defense Command, and, thinking that he’s playing a new computer game, nearly triggers World War III.

The following Wednesday morning, back in the White House, Reagan met with the secretaries of state, defense, and treasury, his national security staff, the chairman of the Joint Chiefs of Staff, and sixteen prominent members of Congress, to discuss a new type of nuclear missile and the prospect of arms talks with the Russians. But he couldn’t get that movie out of his mind. At one point, he put down his index cards and asked if anyone else had seen it. Nobody had (it had just opened in theaters the previous Friday), so he launched into a detailed summary of its plot. Some of the legislators looked around the room with suppressed smiles or arched eyebrows. Not quite three months earlier, Reagan had delivered his “Star Wars” speech, calling on scientists to develop laser weapons that, in the event of war, could shoot down Soviet nuclear missiles as they darted toward America. The idea was widely dismissed as nutty. What was the old man up to now?

After finishing his synopsis, Reagan turned to General John Vessey, the chairman of the Joint Chiefs, the U.S. military’s top officer, and asked, “Could something like this really happen?” Could someone break into our most sensitive computers?

Vessey, who’d grown accustomed to such queries, said he would look into it.

One week later, the general came back to the White House with his answer. WarGames, it turned out, wasn’t at all far-fetched. “Mr. President,” he said, “the problem is much worse than you think.”

Reagan’s question set off a string of interagency memos, working groups, studies, and meetings, which culminated, fifteen months later, in a confidential national security decision directive, NSDD-145, signed September 17, 1984, titled “National Policy on Telecommunications and Automated Information Systems Security.”

It was a prescient document. The first laptop computers had barely hit the market, the first public Internet providers wouldn’t come online for another few years. Yet the authors of NSDD-145 noted that these new devices—which government agencies and high-tech industries had started buying at a rapid clip—were “highly susceptible to interception, unauthorized electronic access, and related forms of technical exploitation.” Hostile foreign intelligence agencies were “extensively” hacking into these services already, and “terrorist groups and criminal elements” had the ability to do so as well.

This sequence of events—Reagan’s oddball question to General Vessey, followed by a pathbreaking policy document—marked the first time that an American president, or a White House directive, discussed what would come to be called “cyber warfare.”

The commotion, for now, was short-lived. NSDD-145 placed the National Security Agency in charge of securing all computer servers and networks in the United States, and, for many, that went too far. The NSA was America’s largest and most secretive intelligence agency. (Insiders joked that the initials stood for “No Such Agency.”) Established in 1952 to intercept foreign communications, it was expressly forbidden from spying on Americans. Civil liberties advocates in Congress were not about to let a presidential decree blur this distinction.

And so the issue vanished, at least in the realm of high-level politics. When it reemerged a dozen years later, after a spate of actual cyber intrusions during Bill Clinton’s presidency, enough time had passed that the senior officials of the day—who didn’t remember, if they’d ever known of, NSDD-145—were shocked by the nation’s seemingly sudden vulnerability to this seemingly brand-new threat.

When the White House again changed hands (and political parties) with the election of George W. Bush, the issue receded once more, at least to the public eye, especially after the terrorist attacks of September 11, 2001, which killed three thousand Americans. Few cared about hypothetical cyber wars when the nation was charging into real ones with bullets and bombs.

But behind closed doors, the Bush administration was weaving cyber war techniques with conventional war plans, and so were the military establishments of several other nations, friendly and otherwise, as the Internet spread to the globe’s far-flung corners. Cyber war emerged as a mutual threat and opportunity, a tool of espionage and a weapon of war, that foes could use to hurt America and that America could use to hurt its foes.

During Barack Obama’s presidency, cyber warfare took off, emerging as one of the few sectors of the defense budget that soared while others stayed stagnant or declined. In 2009, Obama’s first secretary of defense, Robert Gates, a holdover from the Bush years, created a dedicated Cyber Command. In its first three years, the command’s annual budget tripled, from $2.7 billion to $7 billion (plus another $7 billion for cyber activities in the military services, all told), while the ranks of its cyber attack teams swelled from 900 personnel to 4,000, with 14,000 foreseen by the end of the decade.

The cyber field swelled worldwide. By the midpoint of Obama’s presidency, more than twenty nations had formed cyber warfare units in their militaries. Each day brought new reports of cyber attacks, mounted by China, Russia, Iran, Syria, North Korea, and others, against the computer networks of not just the Pentagon and defense contractors but also banks, retailers, factories, electric power grids, waterworks—everything connected to a computer network, and, by the early twenty-first century, that included nearly everything. And, though much less publicized, the United States and a few other Western powers were mounting cyber attacks on other nations’ computer networks, too.

In one sense, these intrusions were nothing new. As far back as Roman times, armies intercepted enemy communications. In the American Civil War, Union and Confederate generals used the new telegraph machines to send false orders to the enemy. During World War II, British and American cryptographers broke German and Japanese codes, a crucial ingredient (kept secret for many years after) in the Allied victory. In the first few decades of the Cold War, American and Russian spies routinely intercepted each other’s radio signals, microwave transmissions, and telephone calls, not just to gather intelligence about intentions and capabilities but, still more, to gain an advantage in the titanic war to come.

In other ways, though, information warfare took on a whole new dimension in the cyber age. Until the new era, the crews gathering SIGINT—signals intelligence—tapped phone lines and swept the skies for stray electrons, but that’s all they could do: listen to conversations, retrieve the signals. In the cyber age, once they hacked a computer, they could prowl the entire network connected to it; and, once inside the network, they could not only read or download scads of information; they could change its content—disrupt, corrupt, or erase it—and mislead or disorient the officials who relied on it.

Once the workings of almost everything in life were controlled by or through computers—the guidance systems of smart bombs, the centrifuges in a uranium-enrichment lab, the control valves of a dam, the financial transactions of banks, even the internal mechanics of cars, thermostats, burglary alarms, toasters—hacking into a network gave a spy or cyber warrior the power to control those centrifuges, dams, and transactions: to switch their settings, slow them down, speed them up, or disable, even destroy them.

This damage was wreaked remotely; the attackers might be half a world away from the target. And unlike the atomic bomb or the intercontinental ballistic missile, which had long ago erased the immunity of distance, a cyber weapon didn't require a large-scale industrial project or a campus of brilliant scientists; all it took to build one was a roomful of computers and a small corps of people trained to use them.

There was another shift: the World Wide Web, as it came to be called, was just that—a network stretched across the globe. Many classified programs ran on this same network; the difference was that their contents were encrypted, but this only meant that, with enough time and effort, they could be decrypted or otherwise penetrated, too. In the old days, if spies wanted to tap a phone, they put a device on a single circuit. In the cyber era, Internet traffic moved at lightning speed, in digital packets, often interspersed with packets containing other people's traffic, so a terrorist's emails or cell phone chatter couldn't be extracted so delicately; everyone's chatter and traffic got tossed in the dragnet, placed, potentially, under the ever-watchful eye.

The expectation arose that wars of the future were bound to be, at least in part, cyber wars; cyberspace was officially labeled a "domain" of warfare, like air, land, sea, and outer space. And because of the seamless worldwide network, the packets, and the Internet of Things, cyber war would involve not just soldiers, sailors, and pilots but, inexorably, the rest of us. When cyberspace is everywhere, cyber war can seep through every digital pore.

During the transitions between presidents, the ideas of cyber warfare were dismissed, ignored, or forgotten, but they never disappeared. All along, and even before Ronald Reagan watched WarGames, esoteric enclaves of the national-security bureaucracy toiled away on fixing—and, still more, exploiting—the flaws in computer software.

General Jack Vessey could answer Reagan's question so quickly—within a week of the meeting on June 8, 1983, where the president asked if someone could really hack the military's computers, like the kid in that movie—because he took the question to a man named Donald Latham. Latham was the assistant secretary of defense for command, control, communications, and intelligence—ASD(C3I), for short—and, as such, the Pentagon's liaison with the National Security Agency, which itself was an extremely secret part of the Department of Defense. Spread out among a vast complex of shuttered buildings in Fort Meade, Maryland, surrounded by armed guards and high gates, the NSA was much larger, better funded, and more densely populated than the more famous Central Intelligence Agency in Langley, Virginia. Like many past (and future) officials in his position, Latham had once worked at the NSA, still had contacts there, and knew the ins and outs of signals intelligence and how to break into communications systems here and abroad.

There were also top secret communications-intelligence bureaus of the individual armed services: the Air Intelligence Agency (later called the Air Force Information Warfare Center) at Kelly Air Force Base in San Antonio, Texas; the 609th Information Warfare Squadron at Shaw Air Force Base in Sumter, South Carolina; scattered cryptology labs in the Navy; the CIA's Critical Defense Technologies Division; the Special Technological Operations Division of J-39, a little known office in the Pentagon's Joint Staff (entry required dialing the combination locks on two metal doors). They all fed to and from the same centers of beyond-top-secret wizardry, some of it homegrown, some manufactured by ESL, Inc. and other specialized private contractors. And they all interacted, in one way or another, with the NSA.

When Reagan asked Vessey if someone could really hack into the military's computers, it was far from the first time the question had been asked. To those who would write NSDD-145, the question was already very old, as old as the Internet itself.

In the late 1960s, long before Ronald Reagan watched WarGames, the Defense Department undertook a program called the ARPANET. Its direct sponsor, ARPA (which stood for Advanced Research Projects Agency), was in charge of developing futuristic weapons for the U.S. military. The idea behind ARPANET was to let the agency's contractors—scientists at labs and universities across the country—share data, papers, and discoveries on the same network. Since more and more researchers were using computers, the idea made sense. As things stood, the director of ARPA had to have as many computer consoles in his office as there were contractors out in the field, each hooked up to a separate telephone modem—one to communicate with UCLA, another with the Stanford Research Institute, another with the University of Utah, and so forth. A single network, linking them all, would not only be more economical, it would also let scientists around the country exchange data more freely and openly; it would be a boon to scientific research.

In April 1967, shortly before ARPANET's rollout, an engineer named Willis Ware wrote a paper called "Security and Privacy in Computer Systems" and delivered it at the semiannual Joint Computer Conference in New York City. Ware was a pioneer in the field of computers, dating back to the late 1940s, when there barely was such a field. At Princeton's Institute for Advanced Studies, he'd been a protégé of John von Neumann, helping design one of the first electrical computers. For years now, he headed the computer science department at the RAND Corporation, an Air Force–funded think tank in Santa Monica, California. He well understood the point of ARPANET, lauded its goals, admired its ambition; but he was worried about some implications that its managers had overlooked.

In his paper, Ware laid out the risks of what he called "resource-sharing" and "on-line" computer networks. As long as computers stood in isolated chambers, security wouldn't be a problem. But once multiple users could access data from unprotected locations, anyone with certain skills could hack into the network—and after hacking into one part of the network, he could roam at will.

Ware was particularly concerned about this problem because he knew that defense contractors had been asking the Pentagon for permission to store classified and unclassified files on a single computer. Again, on one level, the idea made sense: computers were expensive; commingling all the data would save lots of money. But in the impending age of ARPANET, this practice could prove disastrous. A spy who hacked into unclassified networks, which were entirely unprotected, could find "back doors" leading to the classified sections. In other words, the very existence of a network created sensitive vulnerabilities; it would no longer be possible to keep secrets.

Stephen Lukasik, ARPA's deputy director and the supervisor of the ARPANET program, took the paper to Lawrence Roberts, the project's chief scientist. Two years earlier, Roberts had designed a communications link, over a 1200-baud phone line, between a computer at MIT's Lincoln Lab, where he was working at the time, and a colleague's computer in Santa Monica. It was the first time anyone had pulled off the feat: he was, in effect, the Alexander Graham Bell of the computer age. Yet Roberts hadn't thought about the security of this hookup. In fact, Ware's paper annoyed him. He begged Lukasik not to saddle his team with a security requirement: it would be like telling the Wright brothers that their first airplane at Kitty Hawk had to fly fifty miles while carrying twenty passengers. Let's do this step by step, Roberts said. It had been hard enough to get the system to work; the Russians wouldn't be able to build something like this for decades.

He was right; it would take the Russians (and the Chinese and others) decades—about three decades—to develop their versions of the ARPANET and the technology to hack into America's. Meanwhile, vast systems and networks would sprout up throughout the United States and much of the world, without any provisions for security.

Over the next forty years, Ware would serve as a consultant on government boards and commissions dealing with computer security and privacy. In 1980, Lawrence Lasker and Walter Parkes, former Yale classmates in their late twenties, were writing the screenplay for the film that would come to be called WarGames. They were uncertain about some of the plotline's plausibility. A hacker friend had told them about "demon-dialing" (also called "war-dialing"), in which a telephone modem searched for other nearby modems by automatically dialing each phone number in a local area code and letting it ring twice before moving on to the next number. If a modem answered, it would squawk; the demon-dialing software would record that number, and the hacker would call it back later. (This was the way that early computer geeks found one another: a pre-Internet form of web trolling.) In the screenplay, this was how their whiz-kid hero breaks into the NORAD computer. But Lasker and Parkes wondered whether this was possible: wouldn't a military computer be closed off to public phone lines?

Lasker lived in Santa Monica, a few blocks from RAND. Figuring that someone there might be helpful, he called the public affairs officer, who put him in touch with Ware, who invited the pair to his office.

They'd found the right man. Not only had Ware long known about the myriad vulnerabilities of computer networks, he'd helped design the software program at NORAD. And for someone so steeped in the world of big secrets, Ware was remarkably open, even friendly. He looked like Jiminy Cricket from the Disney cartoon film of Pinocchio, and he acted a bit like him, too: excitable, quick-witted, quick to laugh.

Listening to the pair's questions, Ware waved off their worries. Yes, he told them, the NORAD computer was supposed to be closed, but some officers wanted to work from home on the weekend, so they'd leave a port open. Anyone could get in, if the right number was dialed. Ware was letting the fledgling screenwriters in on a secret that few of his colleagues knew. The only computer that's completely secure, he told them with a mischievous smile, is a computer that no one can use.

Ware gave Lasker and Parkes the confidence to move forward with their project. They weren't interested in writing sheer fantasy; they wanted to imbue even the unlikeliest of plot twists with a grain of authenticity, and Ware gave them that. It was fitting that the scenario of WarGames, which aroused Ronald Reagan's curiosity and led to the first national policy on reducing the vulnerability of computers, was in good part the creation of the man who'd first warned that they were vulnerable.

Ware couldn't say so, but besides working for RAND, he also served on the Scientific Advisory Board of the National Security Agency. He knew the many ways in which the NSA's signals intelligence crews were piercing the shields—penetrating the radio and telephone communications—of the Russian and Chinese military establishments. Neither of those countries had computers at the time, but ARPANET was wired through dial-up modems—through phone lines. Ware knew that Russia or China could hack into America's phone lines, and thus into ARPANET, with the same bag of tricks that America was using to hack into their phone lines.

In other words, what the United States was doing to its enemies, its enemies could also do to the United States—maybe not right now, but someday soon.

The National Security Agency had its roots in the First World War. In August 1917, shortly after joining the fight, the United States government created Military Intelligence Branch 8, or MI-8, devoted to deciphering German telegraph signals. The unit stayed open even after the war, under the dual auspices of the war and state departments, inside an inconspicuous building in New York City that its denizens called the Black Chamber. The unit, whose cover name was the Code Compilation Company, monitored communications of suspected subversives; its biggest coup was persuading Western Union to provide access to all the telegrams coming over its wires. The Black Chamber was finally shut down in 1929, after Secretary of State Henry

Stimson proclaimed, “Gentlemen don’t read each other’s mail.” But the practice was revived, with the outbreak of World War II, as the Signal Security Agency, which, along with British counterparts, broke the codes of German and Japanese communications—a feat that helped the Allies win the war. Afterward, it morphed into the Army Security Agency, then the multiservice Armed Forces Security Agency, then in 1952—when President Harry Truman realized the services weren’t cooperating with one another—a unified code-breaking organization called the National Security Agency.

Throughout the Cold War, the NSA set up bases around the world—huge antennas, dishes, and listening stations in the United Kingdom, Canada, Japan, Germany, Australia, and New Zealand—to intercept, translate, and analyze all manner of communications inside the Soviet Union. The CIA and the Air Force flew electronic-intelligence airplanes along, and sometimes across, the Soviet border, picking up signals as well. In still riskier operations, the Navy sent submarines, equipped with antennas and cables, into Soviet harbors.

In the early years of the Cold War, they were all listening mainly to radio signals, which bounced off the ionosphere all around the globe; a powerful antenna or large dish could pick up signals from just about anyplace. Then, in the 1970s, the Russians started switching to microwave transmissions, which beamed across much shorter distances; receivers had to be in the beam’s line of sight to intercept it. So the NSA created joint programs, sending spies from the CIA or other agencies across enemy lines, mainly in the Warsaw Pact nations of Eastern Europe, to erect listening posts that looked like highway markers, telephone poles, or other mundane objects.

Inside Moscow, on the tenth floor of the American embassy, the NSA installed a vast array of electronic intelligence gear. In a city of few skyscrapers, the tenth floor offered a panoramic view. Microwave receivers scooped up phone conversations between top Soviet officials—including Chairman Leonid Brezhnev himself—as they rode around the city in their limousines.

The KGB suspected something peculiar was going on up there. On January 20, 1978, Bobby Ray Inman, the NSA director, was awakened by a phone call from Warren Christopher, the deputy secretary of state. A fire had erupted in the Moscow embassy, and the local fire chief was saying he wouldn’t put it out unless he was given access to the tenth floor. Christopher asked Inman what he should do.

Inman replied, “Let it burn.” (The firefighters eventually put it out anyway. It was one of several fires that mysteriously broke out in the embassy during that era.)

By 1980, the last full year of Jimmy Carter’s presidency, the American spy agencies had penetrated the Soviet military machine so deeply, from so many angles, that analysts were able to piece together a near-complete picture of its operations, patterns, strengths, and weaknesses. And they realized that, despite its enormous buildup in troops and tanks and missiles, the Soviet military was extremely vulnerable.

The fatal gaps lay in the communications links of its command-control systems—the means by which radar operators tracked incoming planes and missiles, general officers sent out orders, and Kremlin higher-ups decided whether to go to war. And once American SIGINT crews were inside Soviet command-control, they could not only learn what the Russians were up to, which was valuable enough; they could also insert false information, disrupt the command signals, even shut them off. These disruptions might not win a war by themselves, but they could tip the balance, sowing confusion among Soviet officers, making them distrust the intelligence they were seeing and the orders they were receiving—which, in the best of scenarios, might stop them from launching a war in the first place.

The Russians, by now, had learned to encrypt their most vital command-control channels, but the NSA figured out how to break the codes, at least some of them. When cryptologists of whatever nationality coded a signal, they usually made a mistake here and there, leaving some passages in plain text. One way to break the code was to find the mistake, work backward to see how that passage—say, an often-used greeting or routine military jargon—had been encrypted in previous communiqués, then unravel the code from there.

Bobby Ray Inman had been director of naval intelligence before he took over the NSA in 1977, at the start of President Carter's term. Even back then, he and his aides had fiddled with encryption puzzles. Now with the NSA's vast secret budget at his disposal, Inman went at the task with full steam. In order to compare encrypted passages with mistakes in the clear, he needed machines that could store a lot of data and process it at high speed. For many years, the NSA had been building computers—vast corridors were filled with them—but this new task exceeded their capacity. So, early on in his term as director, Inman started a program called the Bauded Signals Upgrade, which involved the first "supercomputer." The machine cost more than a billion dollars, and its usefulness was short-lived: once the Soviets caught on that their codes had been broken, they would devise new ones, and the NSA code breakers would have to start over. But for a brief period of Russian obliviousness, the BSU helped break enough high-level codes that, combined with knowledge gained from other penetrations, the United States acquired an edge—potentially a decisive edge—in the deadliest dimension of the Cold War competition.

Inman had a strong ally in the Pentagon's top scientist, William Perry. For a quarter century, Perry had immersed himself in precisely this way of thinking. After his Army service at the end of World War II, Perry earned advanced degrees in mathematics and took a job at Sylvania Labs, one of the many high-tech defense contractors sprouting up in Northern California, the area that would later be called Silicon Valley. While many of these firms were designing radar and weapons systems, Sylvania specialized in electronic countermeasures—devices that jammed, diffracted, or disabled those systems. One of Perry's earliest projects involved intercepting the radio signals guiding a Soviet nuclear warhead as it plunged toward its target, then altering its trajectory, so the warhead swerved off course. Perry figured out a way to do this, but he told his bosses it wouldn't be of much use, since Soviet nuclear warheads were so powerful—several megatons of blast, to say nothing of thermal heat and radioactive fallout—that millions of Americans would die anyway. (This experience led Perry, years later, to become an outspoken advocate of nuclear arms-reduction treaties.)

Still, Perry grasped a key point that most other weapons scientists of the day did not: that getting inside the enemy's communications could drastically alter the effect of a weapon—and maybe the outcome of a battle or a war.

Perry rose through the ranks of Sylvania, taking over as director in 1954, then ten years later he left to form his own company, Electromagnetic Systems Laboratory, or ESL, which did contract work almost exclusively for the NSA and CIA. By the time he joined the Pentagon in 1977, he was as familiar as anyone with the spy agencies' advances in signals intelligence; his company, after all, had built the hardware that made most of those advances possible.

It was Perry who placed these scattershot advances under a single rubric: "counter-C2 warfare," the "C2" standing for "command and control." The phrase derived from his longtime preoccupation with electronic countermeasures, for instance jamming an enemy jet's radar receiver. But while jammers gave jets a tactical edge, counter-C2 warfare was a strategic concept; its goal was to degrade an enemy commander's ability to wage war. The concept regarded communications links—and the technology to intercept, disrupt, or sever them—not merely as a conveyor belt of warfare but as a decisive weapon in its own right.

When Jimmy Carter was briefed on these strategic breakthroughs, he seemed fascinated by the technology. When his successor, the Cold War hawk Ronald Reagan, heard the same briefing a year later, he evinced little interest in the technical details, but was riveted to the big picture: it meant that if war broke out between the superpowers, as many believed likely, the United States could win, maybe quickly and decisively.

In his second term as president, especially after the reformer Mikhail Gorbachev took over the Kremlin, Reagan rethought the implications of American superiority: he realized that his military's aggressive tactics and his own brazen rhetoric were making the Russians jumpy and the world more dangerous; so he softened his rhetoric, reached out to Gorbachev, and the two wound up signing a string of historic arms-reduction treaties that nearly brought the Soviet Union—the "evil empire," as Reagan had once described it—into the international order. But during his first term, Reagan pushed hard on his advantage, encouraging the NSA and other agencies to keep up the counter-C2 campaign.

Amid this pressure, the Russians didn't sit passive. When they found out about the microwaves emanating from the U.S. embassy's tenth floor, they started beaming its windows with their own microwave generators, hoping to listen in on the American spies' conversations.

The Russians grew clever at the spy-counterspy game. At one point, officials learned that the KGB was somehow stealing secrets from the Moscow embassy. The NSA sent over an analyst named Charles Gandy to solve the mystery. Gandy had a knack for finding trapdoors and vulnerabilities in any piece of hardware. He soon found a device called the Gunman inside sixteen IBM Selectric typewriters, which were used by the secretaries of high-level embassy officials. The Gunman recorded every one of their keystrokes and transmitted the data to a receiver in a church across the street. (Subsequent probes revealed that an attractive Russian spy had lured an embassy guard to let her in.)

It soon became clear that the Russians were setting up microwave beams and listening stations all over Washington, D.C., and New York City. Senior Pentagon officials—those whose windows faced high buildings across the Potomac River—took to playing Muzak in their offices while at work, so that if a Russian spy was shooting microwaves at those windows, it would clutter the ambient sound, drowning out their conversations.

Bobby Ray Inman had his aides assess the damage of this new form of spying. President Carter, a technically sophisticated engineer (he loved to examine the blueprints of the military's latest spy satellites), had been assured that his phone conversations, as well as those of the secretaries of state and defense, were carried on secure landlines. But NSA technicians traced those lines and discovered that, once the signal reached Maryland, it was shunted to microwave transmitters, which were vulnerable to interception. There was no evidence the Soviets were listening in, but there was no reason to think they weren't; they certainly could be, with little difficulty.

It took a while, but as more of these vulnerabilities were discovered, and as more evidence emerged that Soviet spies were exploiting them, a disturbing thought smacked a few analysts inside NSA: Anything we're doing to them, they can do to us.

This anxiety deepened as a growing number of corporations, public utilities, and government contractors started storing data and running operations on automated computers—especially since some of them were commingling classified and unclassified data on the same machines, even the same software. Willis Ware's warnings of a dozen years earlier were proving alarmingly prophetic.

Not everyone in the NSA was troubled. There was widespread complacency about the Soviet Union: doubt, even derision at the idea, that a country so technologically backward could do the remarkable things that America's SIGINT crews were doing. More than that, to the extent computer hardware and software had security holes, the NSA's managers were reluctant to patch them. Much of this hardware and software was used (or copied) in countries worldwide, including the targets of NSA surveillance; if it could easily be hacked, so much the better for surveillance.

The NSA had two main directorates: Signals Intelligence and Information Security (later called Information Assurance). SIGINT was the active, glamorous side of the puzzle palace: engineers, cryptologists, and old-school spies, scooping up radio transmissions, tapping into circuits and cables, all aimed at intercepting and analyzing communications that affected national security. Information Security, or INFOSEC, tested the reliability and security of the hardware and software that the SIGINT teams used. But for much of the agency's history, the two sides had no direct contact. They weren't even housed in the same building. Most of the NSA, including the SIGINT Directorate, worked in the massive complex at Fort Meade, Maryland. INFOSEC was a twenty-minute drive away, in a drab brown brick building called FANEX, an annex to Friendship Airport, which later became known as BWI Marshall Airport. (Until 1968, INFOSEC had been still more remote, in a tucked-away building—which, many years later, became the Department of Homeland Security headquarters—on Nebraska Avenue, in Northwest Washington.) INFOSEC technicians had a maintenance function; they weren't integrated into operations at all. And the SIGINT teams did nothing but operations; they didn't share their talents or insights to help repair the flaws in the equipment they were monitoring.

These two entities began to join forces, just a little, toward the end of Carter's presidency. Pentagon officials, increasingly aware that the Soviets were penetrating their communications links, wanted INFOSEC to start testing hardware and software used not only by the NSA but by the Defense Department broadly. Inman set up a new organization, called the Computer Security Center, and asked his science and technology chief, George Cotter, to direct it. Cotter was one of the nation's top cryptologists; he'd been doing signals intelligence since the end of World War II and had worked for the NSA from its inception. Inman wanted the new center to start bringing together the SIGINT operators and the INFOSEC technicians on joint projects. The cultures would remain distinct for years to come, but the walls began to give.

The order to create the Computer Security Center came from the ASD(C3I), the assistant secretary of defense for command, control, communications, and intelligence—the Pentagon's liaison with the NSA. When Reagan became president, his defense secretary, Caspar Weinberger, appointed Donald Latham to the position. Latham had worked SIGINT projects with George Cotter in the early to mid-1970s on the front lines of the Cold War: Latham as chief scientist of U.S. European Command, Cotter as deputy chief of NSA-Europe. They knew, as intimately as anyone, just how deeply both sides—the Soviets and the Americans (and some of their European allies, too)—were getting inside each other's communications channels. After leaving NSA, Latham was named deputy chief of the Pentagon's Office of Microwave, Space and Mobile Systems—and, from there, went on to work in senior engineering posts at Martin Marietta and RCA, where he remained immersed in these issues.

When General Jack Vessey came back from that White House meeting after Ronald Reagan had watched WarGames and asked his aides to find out whether someone could hack into the military's most sensitive computers, it was only natural that his staff would forward the question to Don Latham. It didn't take long for Latham to send back a response, the same response that Vessey would deliver to the president: Yes, the problem is much worse than you think.

Latham was put in charge of working up, and eventually drafting, the presidential directive called NSDD-145. He knew the various ways that the NSA—and, among all federal agencies, only the NSA—could not only hack but also secure telecommunications and computers. So in his draft, he put the NSA in charge of all their security.

The directive called for the creation of a National Telecommunications and Information Systems Security Committee “to consider technical matters” and “develop operating policies” for implementing the new policy. The committee’s chairman would be the ASD(C3I)—that is to say, the chairman would be Don Latham.

The directive also stated that residing within this committee would be a “permanent secretariat composed of personnel of the National Security Agency,” which “shall provide facilities and support as required.” There would also be a “National Manager for Telecommunications and Automated Information Systems Security,” who would “review and approve all standards, techniques, systems, and equipments.” The directive specified that this National Manager would be the NSA director.

It was an ambitious agenda, too ambitious for some. Congressman Jack Brooks, a Texas Democrat and Capitol Hill’s leading civil-liberties advocate, wasn’t about to let the NSA—which was limited, by charter, to surveillance of foreigners—play any role in the daily lives of Americans. He wrote, and his fellow lawmakers passed, a bill that revised the president’s directive and denied the agency any such power. Had Don Latham’s language been left standing, the security standards and compliance of every computer in America—government, business, and personal—would have been placed under the tireless gaze of the NSA.

It wouldn’t be the last time that the agency tried to assert this power—or that someone else pushed back.

DARK TERRITORY: THE SECRET HISTORY OF CYBER WAR BY FRED KAPLAN PDF

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DARK TERRITORY: THE SECRET HISTORY OF CYBER WAR BY FRED KAPLAN PDF

As cyber attacks dominate front-page news and as hackers displace terrorists on the list of global threats, award-winning journalist Fred Kaplan probes the most secretive government agencies to tell the never-before-told story of the officers, policymakers, scientists, and spies who devised a new form of warfare and who have been planning-- and, more often than people know, fighting-- these wars for decades. From the 1991 Gulf War to conflicts in Haiti, Serbia, Syria, the former Soviet republics, Iraq, and Iran, where cyber warfare played a significant role, Dark Territory chronicles, in fascinating detail, a little-known past that shines an unsettling light on our future.

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Review
"A compelling history of cyberwarfare." (Evan Osnos The New Yorker)

“A consistently eye-opening history of our government’s efforts to effectively manage our national security in the face of the largely open global communications network established by the World Wide Web. . . . The great strengths of Dark Territory . . . are the depth of its reporting and the breadth of its ambition. . . . The result is not just a page-turner but consistently surprising. . . . One of the most important themes that emerges from Mr. Kaplan’s nuanced narrative is the extent to which defense and offense are very much two sides of the same coin. . . . The biggest surprise of Dark Territory is the identity of the most prominent domestic heroes and villains in the “secret history.” . . . Dark Territory is the rare tome that leaves the reader feeling generally good about their civilian and military leadership.” (The New York Times)

“A book that grips, informs and alarms, finely researched and lucidly related.” (John le Carré)

“Comprehensively reported history . . . The book’s central question is how should we think about war, retaliation, and defense when our technologically advanced reliance on computers is also our greatest vulnerability?” (The New Yorker)

“Dark Territory captures the troubling but engrossing narrative of America’s struggle to both exploit the opportunities and defend against the risks of a new era of global cyber-insecurity. Assiduously and industriously reported. . . . Kaplan recapitulates one hack after another, building a portrait of bewildering systemic insecurity in the cyber domain. . . . One of the deep insights of Dark Territory is the historical understanding by both theorists and practitioners that cybersecurity is a dynamic game of offense and defense, each function oscillating in perpetual competition.” (The Washington Post)

Dark Territory offers thrilling insights into high-level politics, eccentric computer hackers and information warfare. In 15 chapters—some of them named after classified codenames and official (and unofficial) hacking exercises—Kaplan has encapsulated the past, present and future of cyber war. (The Financial Express)

“An important, disturbing, and gripping history arguing convincingly that, as of 2015, no defense exists against a resourceful cyberattack.” (Kirkus Reviews, starred review)

“Kaplan dives into a topic which could end up being just as transformational to national security affairs as the nuclear age was. The book opens fast and builds from there, providing insights from research that even professionals directly involved in cyber operations will not have gleaned. . . . You will love this book.” (Bob Gourley CTOvision.com)

“The best available history of the U.S. government’s secret use of both cyber spying, and efforts to use its computer prowess for more aggressive attacks. . . . Contains a number of fascinating, little-known stories about the National Security Agency and other secret units of the U.S. military and intelligence community. . . . An especially valuable addition to the debate.” (John Sipher Lawfare)

“Fascinating . . . To understand how deeply we have drifted into legally and politically uncharted waters, read Kaplan’s new book, Dark Territory: The Secret History of Cyber War.” (George F. Will The Washington Post)

"Fred Kaplan’s Dark Territory may become a classic reference for scholars and students seeking to understand the complicated people who ushered the United States into the cyber-conflict era and the tough decisions they made." (Rear Admiral Grace Hopper, Director, Center for Cyber Conflict, US Naval War College Proceedings of the U.S. Naval Institute)

“Deeply sourced. Luckily, he’s not slavishly loyal to his sources.” (Pittsburgh Post-Gazette)

EDITORS' CHOICE (New York Times Book Review)

“Chilling . . . Kaplan is one of America’s leading writers on national security, and his accounts of cyberattacks are gripping . . . assiduously researched.” (Edward Lucas The Times (London))

“Peppered with many fascinating behind-the-scenes anecdotes . . . A readable and informative history.” (P.W. Singer The New York Times Book Review)

A “Hot Type” Book Pick for March 2016 (Vanity Fair)

A “Hot Tech Book of 2016” (Tech Republic)

“Worthy of any spy thriller. . . a strong narrative flow . . . impressivelydetailed . . . deeplyrelevant . . . vital.” (The National (UAE))

“Jarring . . . a rich, behind-the-headlines history of our government’s efforts to make policy for the jaw-dropping vulnerabilities of our ever-increasing dependence on computers. . . . Kaplan renders a vivid account of the long struggle waged by presidents, bureaucrats, generals, private-sector CEOs, and privacy advocates . . . Kaplan enjoys considerable credibility in defense circles, but he guides us through the dark territory of cyber conflict with an omniscient-narrator voice reminiscent of Bob Woodward's behind-the-scenes books. . . . Today, Kaplan argues, it is precisely U.S. pre-eminence in the network connectivity that makes us the most vulnerable target in the world to cyber sabotage." (Washington Independent Review of Books)

"Pulitzer-prizewinning journalist Fred Kaplan's taut, urgent history traces the dual trajectory of digital surveillance and intervention, and high-level US policy from the 1980s on." (NATURE)

"Dark Territory is a remarkable piece of reporting. Fred Kaplan has illuminated not merely the profound vulnerabilities of our nation to cyber warfare, but why it has taken so long for our policy-makers to translate indifference into concern and concern into action. This is a vitally important book by a meticulous journalist." (Ted Koppel, author of Lights Out: A Cyberattack, A Nation Unprepared, Surviving the Aftermath)

"A fascinating account of the people and organizations leading the way towards a cyber war future." (Dorothy E. Denning, author of Information Warfare and Security, 1st Inductee, National Cyber Security Hall of Fame)

"A very in-depth work... its content is enlightening and intelligent and the secrets it uncovers are astounding." (The News Hub)

"Everyone has heard the term 'cyber warfare.' Very few people could explain exactly what it means and why it matters. Dark Territory solves that problem with an account that is both fascinating and authoritative. Fred Kaplan has put the people, the technologies, the dramatic turning points, and the strategic and economic stakes together in a way no author has done before." (James Fallows, national correspondent, The Atlantic)

"Chilling" (Haaretz)

"Revealing. . . . On a vital current-events topic, the well-connected Kaplan's well-sourced history gives readers much to ponder." (Booklist)

"One of the very best books ever written about the American military in the era of small wars . . . Fred Kaplan brings a formidable talent for writing intellectual history." (The New York Review of Books)

"Excellent . . . An intellectual thriller." (Time)

"Excellent . . . Poignant and timely . . . A good read, rich in texture and never less than wise." (Foreign Policy)

"The best account to date of the history of cyber war…a human story: a history as revealed by the people involved in shaping it…full of detail, including information that will be new even to insiders." (The Times Literary Supplement)

"It's not easy to write an engaging book on cyberwar, and Kaplan, a national security columnist at Slate, has done an admirable job. He presents a clear account of the United States' evolution into a formidable cyberpower, guiding the reader through a thicket of technical details and government acronyms." (Foreign Affairs)

About the Author
Fred Kaplan writes the War Stories column in Slate. He's also written about national security for the Atlantic, New York Times, New Yorker, New Republic, and others. He has a PhD from MIT and spent decades covering the Pentagon as a Pulitzer Prize-winning reporter. He lives in Brooklyn with his two daughters and his wife, NPR host Brooke Gladstone.

Dark Territory CHAPTER 1 “COULD SOMETHING LIKE THIS REALLY HAPPEN?”
IT was Saturday, June 4, 1983, and President Ronald Reagan spent the day at Camp David, relaxing, reading some papers, then, after dinner, settling in, as he often did, to watch a movie. That night’s feature was WarGames, starring Matthew Broderick as a tech-whiz teenager who unwittingly hacks into the main computer at NORAD, the North American Aerospace Defense Command, and, thinking that he’s playing a new computer game, nearly triggers World War III.

The following Wednesday morning, back in the White House, Reagan met with the secretaries of state, defense, and treasury, his national security staff, the chairman of the Joint Chiefs of Staff, and sixteen prominent members of Congress, to discuss a new type of nuclear missile and the prospect of arms talks with the Russians. But he couldn’t get that movie out of his mind. At one point, he put down his index cards and asked if anyone else had seen it. Nobody had (it had just opened in theaters the previous Friday), so he launched into a detailed summary of its plot. Some of the legislators looked around the room with suppressed smiles or arched eyebrows. Not quite three months earlier, Reagan had delivered his “Star Wars” speech, calling on scientists to develop laser weapons that, in the event of war, could shoot down Soviet nuclear missiles as they darted toward America. The idea was widely dismissed as nutty. What was the old man up to now?

After finishing his synopsis, Reagan turned to General John Vessey, the chairman of the Joint Chiefs, the U.S. military’s top officer, and asked, “Could something like this really happen?” Could someone break into our most sensitive computers?

Vessey, who’d grown accustomed to such queries, said he would look into it.

One week later, the general came back to the White House with his answer. WarGames, it turned out, wasn’t at all far-fetched. “Mr. President,” he said, “the problem is much worse than you think.”

Reagan’s question set off a string of interagency memos, working groups, studies, and meetings, which culminated, fifteen months later, in a confidential national security decision directive, NSDD-145, signed September 17, 1984, titled “National Policy on Telecommunications and Automated Information Systems Security.”

It was a prescient document. The first laptop computers had barely hit the market, the first public Internet providers wouldn’t come online for another few years. Yet the authors of NSDD-145 noted that these new devices—which government agencies and high-tech industries had started buying at a rapid clip—were “highly susceptible to interception, unauthorized electronic access, and related forms of technical exploitation.” Hostile foreign intelligence agencies were “extensively” hacking into these services already, and “terrorist groups and criminal elements” had the ability to do so as well.

This sequence of events—Reagan’s oddball question to General Vessey, followed by a pathbreaking policy document—marked the first time that an American president, or a White House directive, discussed what would come to be called “cyber warfare.”

The commotion, for now, was short-lived. NSDD-145 placed the National Security Agency in charge of securing all computer servers and networks in the United States, and, for many, that went too far. The NSA was America’s largest and most secretive intelligence agency. (Insiders joked that the initials stood for “No Such Agency.”) Established in 1952 to intercept foreign communications, it was expressly forbidden from spying on Americans. Civil liberties advocates in Congress were not about to let a presidential decree blur this distinction.

And so the issue vanished, at least in the realm of high-level politics. When it reemerged a dozen years later, after a spate of actual cyber intrusions during Bill Clinton’s presidency, enough time had passed that the senior officials of the day—who didn’t remember, if they’d ever known of, NSDD-145—were shocked by the nation’s seemingly sudden vulnerability to this seemingly brand-new threat.

When the White House again changed hands (and political parties) with the election of George W. Bush, the issue receded once more, at least to the public eye, especially after the terrorist attacks of September 11, 2001, which killed three thousand Americans. Few cared about hypothetical cyber wars when the nation was charging into real ones with bullets and bombs.

But behind closed doors, the Bush administration was weaving cyber war techniques with conventional war plans, and so were the military establishments of several other nations, friendly and otherwise, as the Internet spread to the globe’s far-flung corners. Cyber war emerged as a mutual threat and opportunity, a tool of espionage and a weapon of war, that foes could use to hurt America and that America could use to hurt its foes.

During Barack Obama’s presidency, cyber warfare took off, emerging as one of the few sectors of the defense budget that soared while others stayed stagnant or declined. In 2009, Obama’s first secretary of defense, Robert Gates, a holdover from the Bush years, created a dedicated Cyber Command. In its first three years, the command’s annual budget tripled, from $2.7 billion to $7 billion (plus another $7 billion for cyber activities in the military services, all told), while the ranks of its cyber attack teams swelled from 900 personnel to 4,000, with 14,000 foreseen by the end of the decade.

The cyber field swelled worldwide. By the midpoint of Obama’s presidency, more than twenty nations had formed cyber warfare units in their militaries. Each day brought new reports of cyber attacks, mounted by China, Russia, Iran, Syria, North Korea, and others, against the computer networks of not just the Pentagon and defense contractors but also banks, retailers, factories, electric power grids, waterworks—everything connected to a computer network, and, by the early twenty-first century, that included nearly everything. And, though much less publicized, the United States and a few other Western powers were mounting cyber attacks on other nations’ computer networks, too.

In one sense, these intrusions were nothing new. As far back as Roman times, armies intercepted enemy communications. In the American Civil War, Union and Confederate generals used the new telegraph machines to send false orders to the enemy. During World War II, British and American cryptographers broke German and Japanese codes, a crucial ingredient (kept secret for many years after) in the Allied victory. In the first few decades of the Cold War, American and Russian spies routinely intercepted each other’s radio signals, microwave transmissions, and telephone calls, not just to gather intelligence about intentions and capabilities but, still more, to gain an advantage in the titanic war to come.

In other ways, though, information warfare took on a whole new dimension in the cyber age. Until the new era, the crews gathering SIGINT—signals intelligence—tapped phone lines and swept the skies for stray electrons, but that’s all they could do: listen to conversations, retrieve the signals. In the cyber age, once they hacked a computer, they could prowl the entire network connected to it; and, once inside the network, they could not only read or download scads of information; they could change its content—disrupt, corrupt, or erase it—and mislead or disorient the officials who relied on it.

Once the workings of almost everything in life were controlled by or through computers—the guidance systems of smart bombs, the centrifuges in a uranium-enrichment lab, the control valves of a dam, the financial transactions of banks, even the internal mechanics of cars, thermostats, burglary alarms, toasters—hacking into a network gave a spy or cyber warrior the power to control those centrifuges, dams, and transactions: to switch their settings, slow them down, speed them up, or disable, even destroy them.

This damage was wreaked remotely; the attackers might be half a world away from the target. And unlike the atomic bomb or the intercontinental ballistic missile, which had long ago erased the immunity of distance, a cyber weapon didn't require a large-scale industrial project or a campus of brilliant scientists; all it took to build one was a roomful of computers and a small corps of people trained to use them.

There was another shift: the World Wide Web, as it came to be called, was just that—a network stretched across the globe. Many classified programs ran on this same network; the difference was that their contents were encrypted, but this only meant that, with enough time and effort, they could be decrypted or otherwise penetrated, too. In the old days, if spies wanted to tap a phone, they put a device on a single circuit. In the cyber era, Internet traffic moved at lightning speed, in digital packets, often interspersed with packets containing other people's traffic, so a terrorist's emails or cell phone chatter couldn't be extracted so delicately; everyone's chatter and traffic got tossed in the dragnet, placed, potentially, under the ever-watchful eye.

The expectation arose that wars of the future were bound to be, at least in part, cyber wars; cyberspace was officially labeled a "domain" of warfare, like air, land, sea, and outer space. And because of the seamless worldwide network, the packets, and the Internet of Things, cyber war would involve not just soldiers, sailors, and pilots but, inexorably, the rest of us. When cyberspace is everywhere, cyber war can seep through every digital pore.

During the transitions between presidents, the ideas of cyber warfare were dismissed, ignored, or forgotten, but they never disappeared. All along, and even before Ronald Reagan watched WarGames, esoteric enclaves of the national-security bureaucracy toiled away on fixing—and, still more, exploiting—the flaws in computer software.

General Jack Vessey could answer Reagan's question so quickly—within a week of the meeting on June 8, 1983, where the president asked if someone could really hack the military's computers, like the kid in that movie—because he took the question to a man named Donald Latham. Latham was the assistant secretary of defense for command, control, communications, and intelligence—ASD(C3I), for short—and, as such, the Pentagon's liaison with the National Security Agency, which itself was an extremely secret part of the Department of Defense. Spread out among a vast complex of shuttered buildings in Fort Meade, Maryland, surrounded by armed guards and high gates, the NSA was much larger, better funded, and more densely populated than the more famous Central Intelligence Agency in Langley, Virginia. Like many past (and future) officials in his position, Latham had once worked at the NSA, still had contacts there, and knew the ins and outs of signals intelligence and how to break into communications systems here and abroad.

There were also top secret communications-intelligence bureaus of the individual armed services: the Air Intelligence Agency (later called the Air Force Information Warfare Center) at Kelly Air Force Base in San Antonio, Texas; the 609th Information Warfare Squadron at Shaw Air Force Base in Sumter, South Carolina;

scattered cryptology labs in the Navy; the CIA's Critical Defense Technologies Division; the Special Technological Operations Division of J-39, a little known office in the Pentagon's Joint Staff (entry required dialing the combination locks on two metal doors). They all fed to and from the same centers of beyond-top-secret wizardry, some of it homegrown, some manufactured by ESL, Inc. and other specialized private contractors. And they all interacted, in one way or another, with the NSA.

When Reagan asked Vessey if someone could really hack into the military's computers, it was far from the first time the question had been asked. To those who would write NSDD-145, the question was already very old, as old as the Internet itself.

In the late 1960s, long before Ronald Reagan watched WarGames, the Defense Department undertook a program called the ARPANET. Its direct sponsor, ARPA (which stood for Advanced Research Projects Agency), was in charge of developing futuristic weapons for the U.S. military. The idea behind ARPANET was to let the agency's contractors—scientists at labs and universities across the country—share data, papers, and discoveries on the same network. Since more and more researchers were using computers, the idea made sense. As things stood, the director of ARPA had to have as many computer consoles in his office as there were contractors out in the field, each hooked up to a separate telephone modem—one to communicate with UCLA, another with the Stanford Research Institute, another with the University of Utah, and so forth. A single network, linking them all, would not only be more economical, it would also let scientists around the country exchange data more freely and openly; it would be a boon to scientific research.

In April 1967, shortly before ARPANET's rollout, an engineer named Willis Ware wrote a paper called "Security and Privacy in Computer Systems" and delivered it at the semiannual Joint Computer Conference in New York City. Ware was a pioneer in the field of computers, dating back to the late 1940s, when there barely was such a field. At Princeton's Institute for Advanced Studies, he'd been a protégé of John von Neumann, helping design one of the first electrical computers. For years now, he headed the computer science department at the RAND Corporation, an Air Force–funded think tank in Santa Monica, California. He well understood the point of ARPANET, lauded its goals, admired its ambition; but he was worried about some implications that its managers had overlooked.

In his paper, Ware laid out the risks of what he called "resource-sharing" and "on-line" computer networks. As long as computers stood in isolated chambers, security wouldn't be a problem. But once multiple users could access data from unprotected locations, anyone with certain skills could hack into the network—and after hacking into one part of the network, he could roam at will.

Ware was particularly concerned about this problem because he knew that defense contractors had been asking the Pentagon for permission to store classified and unclassified files on a single computer. Again, on one level, the idea made sense: computers were expensive; commingling all the data would save lots of money. But in the impending age of ARPANET, this practice could prove disastrous. A spy who hacked into unclassified networks, which were entirely unprotected, could find "back doors" leading to the classified sections. In other words, the very existence of a network created sensitive vulnerabilities; it would no longer be possible to keep secrets.

Stephen Lukasik, ARPA's deputy director and the supervisor of the ARPANET program, took the paper to Lawrence Roberts, the project's chief scientist. Two years earlier, Roberts had designed a communications link, over a 1200-baud phone line, between a computer at MIT's Lincoln Lab, where he was working at the time, and a colleague's computer in Santa Monica. It was the first time anyone had pulled off the feat: he was, in effect, the Alexander Graham Bell of the computer age. Yet Roberts hadn't thought about the security of this hookup. In fact, Ware's paper annoyed him. He begged Lukasik not to saddle his team with a security requirement: it would be like telling the Wright brothers that their first airplane at Kitty Hawk had to fly fifty miles while carrying twenty passengers. Let's do this step by step, Roberts said. It had been hard enough to get the system to work; the Russians wouldn't be able to build something like this for decades.

He was right; it would take the Russians (and the Chinese and others) decades—about three decades—to develop their versions of the ARPANET and the technology to hack into America's. Meanwhile, vast systems and networks would sprout up throughout the United States and much of the world, without any provisions for security.

Over the next forty years, Ware would serve as a consultant on government boards and commissions dealing with computer security and privacy. In 1980, Lawrence Lasker and Walter Parkes, former Yale classmates in their late twenties, were writing the screenplay for the film that would come to be called WarGames. They were uncertain about some of the plotline's plausibility. A hacker friend had told them about "demon-dialing" (also called "war-dialing"), in which a telephone modem searched for other nearby modems by automatically dialing each phone number in a local area code and letting it ring twice before moving on to the next number. If a modem answered, it would squawk; the demon-dialing software would record that number, and the hacker would call it back later. (This was the way that early computer geeks found one another: a pre-Internet form of web trolling.) In the screenplay, this was how their whiz-kid hero breaks into the NORAD computer. But Lasker and Parkes wondered whether this was possible: wouldn't a military computer be closed off to public phone lines?

Lasker lived in Santa Monica, a few blocks from RAND. Figuring that someone there might be helpful, he called the public affairs officer, who put him in touch with Ware, who invited the pair to his office.

They'd found the right man. Not only had Ware long known about the myriad vulnerabilities of computer networks, he'd helped design the software program at NORAD. And for someone so steeped in the world of big secrets, Ware was remarkably open, even friendly. He looked like Jiminy Cricket from the Disney cartoon film of Pinocchio, and he acted a bit like him, too: excitable, quick-witted, quick to laugh.

Listening to the pair's questions, Ware waved off their worries. Yes, he told them, the NORAD computer was supposed to be closed, but some officers wanted to work from home on the weekend, so they'd leave a port open. Anyone could get in, if the right number was dialed. Ware was letting the fledgling screenwriters in on a secret that few of his colleagues knew. The only computer that's completely secure, he told them with a mischievous smile, is a computer that no one can use.

Ware gave Lasker and Parkes the confidence to move forward with their project. They weren't interested in writing sheer fantasy; they wanted to imbue even the unlikeliest of plot twists with a grain of authenticity, and Ware gave them that. It was fitting that the scenario of WarGames, which aroused Ronald Reagan's curiosity and led to the first national policy on reducing the vulnerability of computers, was in good part the creation of the man who'd first warned that they were vulnerable.

Ware couldn't say so, but besides working for RAND, he also served on the Scientific Advisory Board of the National Security Agency. He knew the many ways in which the NSA's signals intelligence crews were piercing the shields—penetrating the radio and telephone communications—of the Russian and Chinese military establishments. Neither of those countries had computers at the time, but ARPANET was wired through dial-up modems—through phone lines. Ware knew that Russia or China could hack into America's phone lines, and thus into ARPANET, with the same bag of tricks that America was using to hack into their phone lines.

In other words, what the United States was doing to its enemies, its enemies could also do to the United States—maybe not right now, but someday soon.

The National Security Agency had its roots in the First World War. In August 1917, shortly after joining the fight, the United States government created Military Intelligence Branch 8, or MI-8, devoted to deciphering German telegraph signals. The unit stayed open even after the war, under the dual auspices of the war and state departments, inside an inconspicuous building in New York City that its denizens called the Black Chamber. The unit, whose cover name was the Code Compilation Company, monitored communications of suspected subversives; its biggest coup was persuading Western Union to provide access to all the telegrams coming over its wires. The Black Chamber was finally shut down in 1929, after Secretary of State Henry Stimson proclaimed, “Gentlemen don’t read each other’s mail.” But the practice was revived, with the outbreak of World War II, as the Signal Security Agency, which, along with British counterparts, broke the codes of German and Japanese communications—a feat that helped the Allies win the war. Afterward, it morphed into the Army Security Agency, then the multiservice Armed Forces Security Agency, then in 1952—when President Harry Truman realized the services weren’t cooperating with one another—a unified code-breaking organization called the National Security Agency.

Throughout the Cold War, the NSA set up bases around the world—huge antennas, dishes, and listening stations in the United Kingdom, Canada, Japan, Germany, Australia, and New Zealand—to intercept, translate, and analyze all manner of communications inside the Soviet Union. The CIA and the Air Force flew electronic-intelligence airplanes along, and sometimes across, the Soviet border, picking up signals as well. In still riskier operations, the Navy sent submarines, equipped with antennas and cables, into Soviet harbors.

In the early years of the Cold War, they were all listening mainly to radio signals, which bounced off the ionosphere all around the globe; a powerful antenna or large dish could pick up signals from just about anyplace. Then, in the 1970s, the Russians started switching to microwave transmissions, which beamed across much shorter distances; receivers had to be in the beam’s line of sight to intercept it. So the NSA created joint programs, sending spies from the CIA or other agencies across enemy lines, mainly in the Warsaw Pact nations of Eastern Europe, to erect listening posts that looked like highway markers, telephone poles, or other mundane objects.

Inside Moscow, on the tenth floor of the American embassy, the NSA installed a vast array of electronic intelligence gear. In a city of few skyscrapers, the tenth floor offered a panoramic view. Microwave receivers scooped up phone conversations between top Soviet officials—including Chairman Leonid Brezhnev himself—as they rode around the city in their limousines.

The KGB suspected something peculiar was going on up there. On January 20, 1978, Bobby Ray Inman, the NSA director, was awakened by a phone call from Warren Christopher, the deputy secretary of state. A fire had erupted in the Moscow embassy, and the local fire chief was saying he wouldn’t put it out unless he was given access to the tenth floor. Christopher asked Inman what he should do.

Inman replied, “Let it burn.” (The firefighters eventually put it out anyway. It was one of several fires that mysteriously broke out in the embassy during that era.)

By 1980, the last full year of Jimmy Carter’s presidency, the American spy agencies had penetrated the Soviet military machine so deeply, from so many angles, that analysts were able to piece together a near-complete picture of its operations, patterns, strengths, and weaknesses. And they realized that, despite its enormous buildup in troops and tanks and missiles, the Soviet military was extremely vulnerable.

The fatal gaps lay in the communications links of its command-control systems—the means by which radar operators tracked incoming planes and missiles, general officers sent out orders, and Kremlin higher-ups decided whether to go to war. And once American SIGINT crews were inside Soviet command-control, they could not only learn what the Russians were up to, which was valuable enough; they could also insert false information, disrupt the command signals, even shut them off. These disruptions might not win a war by themselves, but they could tip the balance, sowing confusion among Soviet officers, making them distrust the intelligence they were seeing and the orders they were receiving—which, in the best of scenarios, might stop them from launching a war in the first place.

The Russians, by now, had learned to encrypt their most vital command-control channels, but the NSA figured out how to break the codes, at least some of them. When cryptologists of whatever nationality coded a signal, they usually made a mistake here and there, leaving some passages in plain text. One way to break the code was to find the mistake, work backward to see how that passage—say, an often-used greeting or routine military jargon—had been encrypted in previous communiqués, then unravel the code from there.

Bobby Ray Inman had been director of naval intelligence before he took over the NSA in 1977, at the start of President Carter's term. Even back then, he and his aides had fiddled with encryption puzzles. Now with the NSA's vast secret budget at his disposal, Inman went at the task with full steam. In order to compare encrypted passages with mistakes in the clear, he needed machines that could store a lot of data and process it at high speed. For many years, the NSA had been building computers—vast corridors were filled with them—but this new task exceeded their capacity. So, early on in his term as director, Inman started a program called the Bauded Signals Upgrade, which involved the first "supercomputer." The machine cost more than a billion dollars, and its usefulness was short-lived: once the Soviets caught on that their codes had been broken, they would devise new ones, and the NSA code breakers would have to start over. But for a brief period of Russian obliviousness, the BSU helped break enough high-level codes that, combined with knowledge gained from other penetrations, the United States acquired an edge—potentially a decisive edge—in the deadliest dimension of the Cold War competition.

Inman had a strong ally in the Pentagon's top scientist, William Perry. For a quarter century, Perry had immersed himself in precisely this way of thinking. After his Army service at the end of World War II, Perry earned advanced degrees in mathematics and took a job at Sylvania Labs, one of the many high-tech defense contractors sprouting up in Northern California, the area that would later be called Silicon Valley. While many of these firms were designing radar and weapons systems, Sylvania specialized in electronic countermeasures—devices that jammed, diffracted, or disabled those systems. One of Perry's earliest projects involved intercepting the radio signals guiding a Soviet nuclear warhead as it plunged toward its target, then altering its trajectory, so the warhead swerved off course. Perry figured out a way to do this, but he told his bosses it wouldn't be of much use, since Soviet nuclear warheads were so powerful—several megatons of blast, to say nothing of thermal heat and radioactive fallout—that millions of Americans would die anyway. (This experience led Perry, years later, to become an outspoken advocate of nuclear arms-reduction treaties.)

Still, Perry grasped a key point that most other weapons scientists of the day did not: that getting inside the enemy's communications could drastically alter the effect of a weapon—and maybe the outcome of a battle or a war.

Perry rose through the ranks of Sylvania, taking over as director in 1954, then ten years later he left to form his own company, Electromagnetic Systems Laboratory, or ESL, which did contract work almost exclusively for the NSA and CIA. By the time he joined the Pentagon in 1977, he was as familiar as anyone with the spy agencies' advances in signals intelligence; his company, after all, had built the hardware that made most of those advances possible.

It was Perry who placed these scattershot advances under a single rubric: “counter-C2 warfare,” the “C2” standing for “command and control.” The phrase derived from his longtime preoccupation with electronic countermeasures, for instance jamming an enemy jet’s radar receiver. But while jammers gave jets a tactical edge, counter-C2 warfare was a strategic concept; its goal was to degrade an enemy commander’s ability to wage war. The concept regarded communications links—and the technology to intercept, disrupt, or sever them—not merely as a conveyor belt of warfare but as a decisive weapon in its own right.

When Jimmy Carter was briefed on these strategic breakthroughs, he seemed fascinated by the technology. When his successor, the Cold War hawk Ronald Reagan, heard the same briefing a year later, he evinced little interest in the technical details, but was riveted to the big picture: it meant that if war broke out between the superpowers, as many believed likely, the United States could win, maybe quickly and decisively.

In his second term as president, especially after the reformer Mikhail Gorbachev took over the Kremlin, Reagan rethought the implications of American superiority: he realized that his military’s aggressive tactics and his own brazen rhetoric were making the Russians jumpy and the world more dangerous; so he softened his rhetoric, reached out to Gorbachev, and the two wound up signing a string of historic arms-reduction treaties that nearly brought the Soviet Union—the “evil empire,” as Reagan had once described it—into the international order. But during his first term, Reagan pushed hard on his advantage, encouraging the NSA and other agencies to keep up the counter-C2 campaign.

Amid this pressure, the Russians didn’t sit passive. When they found out about the microwaves emanating from the U.S. embassy’s tenth floor, they started beaming its windows with their own microwave generators, hoping to listen in on the American spies’ conversations.

The Russians grew clever at the spy-counterspy game. At one point, officials learned that the KGB was somehow stealing secrets from the Moscow embassy. The NSA sent over an analyst named Charles Gandy to solve the mystery. Gandy had a knack for finding trapdoors and vulnerabilities in any piece of hardware. He soon found a device called the Gunman inside sixteen IBM Selectric typewriters, which were used by the secretaries of high-level embassy officials. The Gunman recorded every one of their keystrokes and transmitted the data to a receiver in a church across the street. (Subsequent probes revealed that an attractive Russian spy had lured an embassy guard to let her in.)

It soon became clear that the Russians were setting up microwave beams and listening stations all over Washington, D.C., and New York City. Senior Pentagon officials—those whose windows faced high buildings across the Potomac River—took to playing Muzak in their offices while at work, so that if a Russian spy was shooting microwaves at those windows, it would clutter the ambient sound, drowning out their conversations.

Bobby Ray Inman had his aides assess the damage of this new form of spying. President Carter, a technically sophisticated engineer (he loved to examine the blueprints of the military’s latest spy satellites), had been assured that his phone conversations, as well as those of the secretaries of state and defense, were carried on secure landlines. But NSA technicians traced those lines and discovered that, once the signal reached Maryland, it was shunted to microwave transmitters, which were vulnerable to interception. There was no evidence the Soviets were listening in, but there was no reason to think they weren’t; they certainly could be, with little difficulty.

It took a while, but as more of these vulnerabilities were discovered, and as more evidence emerged that

Soviet spies were exploiting them, a disturbing thought smacked a few analysts inside NSA: Anything we're doing to them, they can do to us.

This anxiety deepened as a growing number of corporations, public utilities, and government contractors started storing data and running operations on automated computers—especially since some of them were commingling classified and unclassified data on the same machines, even the same software. Willis Ware's warnings of a dozen years earlier were proving alarmingly prophetic.

Not everyone in the NSA was troubled. There was widespread complacency about the Soviet Union: doubt, even derision at the idea, that a country so technologically backward could do the remarkable things that America's SIGINT crews were doing. More than that, to the extent computer hardware and software had security holes, the NSA's managers were reluctant to patch them. Much of this hardware and software was used (or copied) in countries worldwide, including the targets of NSA surveillance; if it could easily be hacked, so much the better for surveillance.

The NSA had two main directorates: Signals Intelligence and Information Security (later called Information Assurance). SIGINT was the active, glamorous side of the puzzle palace: engineers, cryptologists, and old-school spies, scooping up radio transmissions, tapping into circuits and cables, all aimed at intercepting and analyzing communications that affected national security. Information Security, or INFOSEC, tested the reliability and security of the hardware and software that the SIGINT teams used. But for much of the agency's history, the two sides had no direct contact. They weren't even housed in the same building. Most of the NSA, including the SIGINT Directorate, worked in the massive complex at Fort Meade, Maryland. INFOSEC was a twenty-minute drive away, in a drab brown brick building called FANEX, an annex to Friendship Airport, which later became known as BWI Marshall Airport. (Until 1968, INFOSEC had been still more remote, in a tucked-away building—which, many years later, became the Department of Homeland Security headquarters—on Nebraska Avenue, in Northwest Washington.) INFOSEC technicians had a maintenance function; they weren't integrated into operations at all. And the SIGINT teams did nothing but operations; they didn't share their talents or insights to help repair the flaws in the equipment they were monitoring.

These two entities began to join forces, just a little, toward the end of Carter's presidency. Pentagon officials, increasingly aware that the Soviets were penetrating their communications links, wanted INFOSEC to start testing hardware and software used not only by the NSA but by the Defense Department broadly. Inman set up a new organization, called the Computer Security Center, and asked his science and technology chief, George Cotter, to direct it. Cotter was one of the nation's top cryptologists; he'd been doing signals intelligence since the end of World War II and had worked for the NSA from its inception. Inman wanted the new center to start bringing together the SIGINT operators and the INFOSEC technicians on joint projects. The cultures would remain distinct for years to come, but the walls began to give.

The order to create the Computer Security Center came from the ASD(C3I), the assistant secretary of defense for command, control, communications, and intelligence—the Pentagon's liaison with the NSA. When Reagan became president, his defense secretary, Caspar Weinberger, appointed Donald Latham to the position. Latham had worked SIGINT projects with George Cotter in the early to mid-1970s on the front lines of the Cold War: Latham as chief scientist of U.S. European Command, Cotter as deputy chief of NSA-Europe. They knew, as intimately as anyone, just how deeply both sides—the Soviets and the Americans (and some of their European allies, too)—were getting inside each other's communications channels. After leaving NSA, Latham was named deputy chief of the Pentagon's Office of Microwave, Space and Mobile Systems—and, from there, went on to work in senior engineering posts at Martin Marietta and RCA, where he remained immersed in these issues.

When General Jack Vessey came back from that White House meeting after Ronald Reagan had watched WarGames and asked his aides to find out whether someone could hack into the military's most sensitive computers, it was only natural that his staff would forward the question to Don Latham. It didn't take long for Latham to send back a response, the same response that Vessey would deliver to the president: Yes, the problem is much worse than you think.

Latham was put in charge of working up, and eventually drafting, the presidential directive called NSDD-145. He knew the various ways that the NSA—and, among all federal agencies, only the NSA—could not only hack but also secure telecommunications and computers. So in his draft, he put the NSA in charge of all their security.

The directive called for the creation of a National Telecommunications and Information Systems Security Committee "to consider technical matters" and "develop operating policies" for implementing the new policy. The committee's chairman would be the ASD(C3I)—that is to say, the chairman would be Don Latham.

The directive also stated that residing within this committee would be a "permanent secretariat composed of personnel of the National Security Agency," which "shall provide facilities and support as required." There would also be a "National Manager for Telecommunications and Automated Information Systems Security," who would "review and approve all standards, techniques, systems, and equipments." The directive specified that this National Manager would be the NSA director.

It was an ambitious agenda, too ambitious for some. Congressman Jack Brooks, a Texas Democrat and Capitol Hill's leading civil-liberties advocate, wasn't about to let the NSA—which was limited, by charter, to surveillance of foreigners—play any role in the daily lives of Americans. He wrote, and his fellow lawmakers passed, a bill that revised the president's directive and denied the agency any such power. Had Don Latham's language been left standing, the security standards and compliance of every computer in America—government, business, and personal—would have been placed under the tireless gaze of the NSA.

It wouldn't be the last time that the agency tried to assert this power—or that someone else pushed back.

Most helpful customer reviews

104 of 108 people found the following review helpful.
Essential reading on the history of U.S. cyber warfare
By Javier A Botero
I spent over two years producing a feature documentary for Alex Gibney called "Zero Days," about the use of cyber means in warfare. The day before our premiere at the Berlin Film Festival, the New York Times reported on one of our findings, the discovery of a classified program at U.S. Cyber Command and NSA, codeword Nitro Zeus, focused on waging a massive cyber war campaign against Iran.

I say this simply so I can emphasize the following: I wish that we had had Fred Kaplan's "Dark Territory" when we began work on our film.

The use of cyber attack by the military is a topic cloaked in secrecy, a topic that many at the very highest levels of government remain fearful to speak about even in scant outlines. It was only through years of painstaking journalistic work by a team of investigators that we could piece together the understanding of the cyber world that allowed us to make our film, including the crucial awareness of the deep history that led to operations like Olympic Games and Nitro Zeus. Kaplan has performed a tremendous service by making that history plain to the public here in this book.

For those interested in the history of the subject, the books that are worth reading are few. Jay Healey's "A Fierce Domain" and Shane Harris's "@War" are excellent complements to Kaplan. I expect Thomas Rid's upcoming book will join that list.

But start with Kaplan. He has details you won't find elsewhere, and tells the story with characteristic skill. Knowing how heavy that cloak of secrecy weighs on the people who have worked behind it, I am impressed by what Kaplan has achieved here, and I highly recommend the book.

32 of 34 people found the following review helpful.
The material is new, and terrifying, but the story is hard to follow
By Mal Warwick
Occasionally, I come across a book on an important topic that's crammed with information I was able to find nowhere else — but is a chore to read. Even though it is not an academic study but clearly intended for a general audience, Fred Kaplan's recent history of cyber war, Dark Territory, is one such book.

A story stretching over five decades

Unlike previous treatments that I've read about the topic, which zero in on the vulnerability of the American economy to attacks through cyberspace, Dark Territory traces the history of our government's slowly growing awareness of the threat, beginning nearly half a century ago. Then, a prescient Pentagon scientist wrote a paper warning about the dangers inherent in computer networks. Apparently, though, no one in a position to do anything about it paid much attention to him.

Kaplan identifies an incident fully fifteen years later in 1984 when President Ronald Reagan — a movie fan, of course — saw the film War Games. He queried the chairman of the Joint Chiefs of Staff at a top-level White House meeting whether it was possible for a teenager like the one portrayed in the film by Matthew Broderick to hack into sensitive Pentagon computers. When the chairman, General John Vessey, reported some time later that the feat was in fact possible, Reagan called for and later signed the government's first policy directive on the topic of cyber war. But that, too, led to no significant change at the Pentagon or anywhere else in the federal government.

Dark Territory is filled with revealing anecdotes like this, based on what surely was top-secret information not long ago. Kaplan reveals many little-known details about the Russian cyber war on Estonia and Ukraine, the Chinese Army's prodigious hacking of American corporations and the Pentagon, the massive North Korean assault on Sony, Iran's disabling of 20,000 computers in Sheldon Adelson's casino empire, and the successful US-Israeli attack on Iran's nuclear infrastructure. Kaplan also reveals the reason why US complaints about China's cyber attacks have fallen on deaf ears: it turns out that the National Security Agency is attacking the Chinese government in much the same way. As The Guardian revealed in 2013, "the NSA had launched more than 61,000 cyber operation, including attacks on hundreds of computers in Hong Kong and mainland China."

The book casts a particularly harsh light on the Administration of George W. Bush. Bush, Cheney, Rumsfeld, and other senior officials in the early 2000s cavalierly dismissed urgent reports from national security and intelligence officials that the threat of cyber war, and the vulnerability of the US economy, were growing at an alarming rate. Only under Bush's successor did reality strongly take hold. As Kaplan writes, "During Barack Obama's presidency, cyber warfare took off, emerging as one of the few sectors in the defense budget that soared while others stayed stagnant or declined."

It's difficult to understand how anyone who was awake could have failed to grasp the problem. For example, a war game conducted in 1997 was intended to test the vulnerability of the Pentagon's computer systems within two weeks. "But the game was over — the entire defense establishment's network was penetrated — in four days. The National Military Command Center — the facility that would transmit orders from the president of the United States in wartime — was hacked on the first day. And most of the officers manning those servers didn't even know they'd been hacked." Not long afterwards, the Pentagon was hacked in a similar way by two 16-year-old boys in San Francisco. And when national security officials widened the scope of their attention to encompass the country's critical civilian infrastructure, such as the electricity grid, they were shocked to discover that the situation was far worse. The Pentagon eventually bowed to the warnings and implemented needed security measures. But private corporations blatantly refused to do so because they didn't want to spend the money — and Congress declined to allow the federal government to make security measures obligatory.

Unfortunately, Kaplan's book is poorly organized. It's roughly structured along chronological lines but jumps back and forth through time with such regularity as to be dizzying. And it's crammed so full of the names of sometimes obscure government officials and military officers that it becomes even more difficult to follow the thread of the story.

However, these challenges aside, a picture clearly emerges from Dark Territory: For decades the American public has been at the mercy of incompetent and pigheaded people in sensitive positions in the government, the military, and private industry — and we still are. Bureaucratic games proliferate. Politics intrude. Inter-service rivalries abound. Personal grudges get in the way. Repeatedly, some of those who are entrusted with the security of the American people make what even at the time could easily be seen as stupid decisions.

Other takes on cyber war

Last year I read and reviewed a book titled Future Crimes: Everything Is Connected, Everyone Is Vulnerable and What We Can Do About It, by Marc Goodman. I described it as "the scariest book I've read in years."

Five years earlier, I read Cyber War: The Next Threat to National Security and What to Do About It, by Richard A. Clarke and Robert K. Knake. From the early 1970s until George W. Bush's invasion of Iraq, Clarke filled high-level national security positions under seven Presidents, so he knows whereof he writes. (He resigned in protest over the invasion of Iraq, which he thought distracted the government from the real threats facing the country.) Not long afterward, I read and reviewed Worm: The First Digital World War, by Mark Bowden, a much more focused treatment of the topic — a case study, really — but equally unsettling.

Though less current, all three of these books are better organized and more readable than Dark Territory. Admittedly, though, Kaplan's book reveals the history that is only hinted at in the others.

About the author

Fred Kaplan wrote five previous books about the nuclear arms race and other topics bearing on US national security. He was on a team at the Boston Globe in 1983 that won a Pulitzer Prize for a series about the nuclear arms race.

47 of 49 people found the following review helpful.
The Dark Territory of Cyber Space War and what lies within, beneath and more. It's an Excellent View by Fred Kaplan!
By Carbonlord
After recently reading Robert Gates: Passion for Leadership book, I was enthralled with this Fred Kaplan

tome, “Dark Territory”, especially since Robert Gates (Former Defense Secretary and Director of the CIA) referred to the online cyber world as the Dark Territory. Its aptly named and has long been a personal belief of mine since before the world wide web existed, when the internet was a vast majority of random servers and bulletin board systems. Even at that point, it was filled to the brim with persons and groups of individuals hacking and forging their way through the original emptiness of what we have come to know as today’s internet.

Since the dawn of that existence, both sides have been at war, a cyberwar between good and evil, dark and light, knowledge and secrecy. It has always been an avid interest of mine to go deeper into this realm and now Kaplan, a Pulitzer prize winning author brings us into the climax of it.

I say highlights because Kaplan starts off by bringing us into how President Reagan initially jumped on board while viewing the movie War Games with Matthew Broderick and wondering if this could actually happen and the answer was a resounding “yes.”

I say highlights because Kaplan traverses this ground and jumps throughout the internet’s history recalling many stories, interviews with anonymous hackers and although he has a great depth to his reporting, in my view, he is just scratching the surface in relation to many issues and histories of the battleground that is cyberspace.

For those that are unfamiliar with a lot of the history, events and inner workings of what takes place, he does a fantastic job, spotlighting some pivotal moments to help these readers be aware of what goes on in “Dark Territory” Since before the world web existed, our government has largely tapped into a venerable resource for both offensive attacks and defensive efforts to protect our national security. Even though the internet has opened a global stage for other countries trying to accomplish the same goals, it is an extensively daunting battle uphill. This totality of cyber wars has outrun our conventional wars and will continue to be on the upstroke.

Even so, Kaplan kept me interested with tidbits of information from Reagan and “War Games" to “Sneakers” and the NSA, showing the screenwriters for both and how they were intimately tied in with the RAND corporation and how they took cues from one of the original programmers for the North American Aerospace Defense Command computer, and never knew that he was also on an advisory board to the National Security Agency.

These tidbits, highlights and coincidences form a lot of the interweaving of the book, even though Kaplan jumps back and forth through different eras to show us this. He touches on various Presidents and how they viewed cybersecurity and their reasoning for and/or against, throughout history. He brings us on varying accounts of how our government averts disaster, as well as how they have mounted attacks. He talks about Edward Snowden and President Obama’s reactions to the same. Corporate securities, attacks on various corporations (eBay, Sony, Target and many others), banks and generally anything in between. He brings to light, the theme of protecting our nation while balancing our civil liberties, as we are currently seeing now with the Apple quagmire of recent weeks. The book is filled with complexities and is well told and researched by Kaplan.

I believe as I said before, that this just brings to light, a surface view of what is really transpiring daily, on the world wide web. There are so many factors to counter in, with cyber attacks and cyber sabotage, both inward and outward, in between corporations, individuals and government. There is the “Deep Web” running its underground drug trade, credit card fraud trades, human trafficking and much more throughout the world on anonymous TOR servers. The new currency of the criminal world, as Bitcoin has shown us and since most of the credit card fraud trade is Russian and Chinese based, it effectually is bringing about a new world war throughout cyberspace that we have to consistently be aware of, reminiscent of our intelligence operations in the Cold War.

There are simply too many factors to this “Dark Territory” to cover effectively in one book, but I really enjoyed that Kaplan has directed our attention to a taste of it for us. Especially for those reading the book, that do not have this knowledge beforehand, it is an eye opening tour for most readers.

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Review
"A compelling history of cyberwarfare." (Evan Osnos The New Yorker)

“A consistently eye-opening history of our government’s efforts to effectively manage our national security in the face of the largely open global communications network established by the World Wide Web. . . . The great strengths of Dark Territory . . . are the depth of its reporting and the breadth of its ambition. . . . The result is not just a page-turner but consistently surprising. . . . One of the most important themes that emerges from Mr. Kaplan’s nuanced narrative is the extent to which defense and offense are very much two sides of the same coin. . . . The biggest surprise of Dark Territory is the identity of the most prominent domestic heroes and villains in the “secret history.” . . . Dark Territory is the rare tome that leaves the reader feeling generally good about their civilian and military leadership.” (The New York Times)

“A book that grips, informs and alarms, finely researched and lucidly related.” (John le Carré)

“Comprehensively reported history . . . The book’s central question is how should we think about war, retaliation, and defense when our technologically advanced reliance on computers is also our greatest vulnerability?” (The New Yorker)

“Dark Territory captures the troubling but engrossing narrative of America’s struggle to both exploit the opportunities and defend against the risks of a new era of global cyber-insecurity. Assiduously and industriously reported. . . . Kaplan recapitulates one hack after another, building a portrait of bewildering systemic insecurity in the cyber domain. . . . One of the deep insights of Dark Territory is the historical understanding by both theorists and practitioners that cybersecurity is a dynamic game of offense and defense, each function oscillating in perpetual competition.” (The Washington Post)

Dark Territory offers thrilling insights into high-level politics, eccentric computer hackers and information warfare. In 15 chapters—some of them named after classified codenames and official (and unofficial) hacking exercises—Kaplan has encapsulated the past, present and future of cyber war. (The Financial Express)

“An important, disturbing, and gripping history arguing convincingly that, as of 2015, no defense exists against a resourceful cyberattack.” (Kirkus Reviews, starred review)

“Kaplan dives into a topic which could end up being just as transformational to national security affairs as the nuclear age was. The book opens fast and builds from there, providing insights from research that even professionals directly involved in cyber operations will not have gleaned. . . . You will love this book.” (Bob Gourley CTOvision.com)

“The best available history of the U.S. government’s secret use of both cyber spying, and efforts to use its computer prowess for more aggressive attacks. . . . Contains a number of fascinating, little-known stories about the National Security Agency and other secret units of the U.S. military and intelligence community. . . . An especially valuable addition to the debate.” (John Sipher Lawfare)

“Fascinating . . . To understand how deeply we have drifted into legally and politically uncharted waters, read Kaplan’s new book, Dark Territory: The Secret History of Cyber War.” (George F. Will The Washington Post)

"Fred Kaplan’s Dark Territory may become a classic reference for scholars and students seeking to understand the complicated people who ushered the United States into the cyber-conflict era and the tough decisions they made." (Rear Admiral Grace Hopper, Director, Center for Cyber Conflict, US Naval War College Proceedings of the U.S. Naval Institute)

“Deeply sourced. Luckily, he’s not slavishly loyal to his sources.” (Pittsburgh Post-Gazette)

EDITORS' CHOICE (New York Times Book Review)

“Chilling . . . Kaplan is one of America’s leading writers on national security, and his accounts of cyberattacks are gripping . . . assiduously researched.” (Edward Lucas The Times (London))

“Peppered with many fascinating behind-the-scenes anecdotes . . . A readable and informative history.” (P.W. Singer The New York Times Book Review)

A “Hot Type” Book Pick for March 2016 (Vanity Fair)

A “Hot Tech Book of 2016” (Tech Republic)

“Worthy of any spy thriller. . . a strong narrative flow . . . impressivelydetailed . . . deeplyrelevant . . . vital.” (The National (UAE))

“Jarring . . . a rich, behind-the-headlines history of our government’s efforts to make policy for the jaw-dropping vulnerabilities of our ever-increasing dependence on computers. . . . Kaplan renders a vivid account of the long struggle waged by presidents, bureaucrats, generals, private-sector CEOs, and privacy advocates . . . Kaplan enjoys considerable credibility in defense circles, but he guides us through the dark territory of cyber conflict with an omniscient-narrator voice reminiscent of Bob Woodward’s behind-the-scenes books. . . . Today, Kaplan argues, it is precisely U.S. pre-eminence in the network connectivity that makes us the most vulnerable target in the world to cyber sabotage.” (Washington Independent Review of Books)

“Pulitzer-prizewinning journalist Fred Kaplan’s taut, urgent history traces the dual trajectory of digital surveillance and intervention, and high-level US policy from the 1980s on.” (NATURE)

“Dark Territory is a remarkable piece of reporting. Fred Kaplan has illuminated not merely the profound vulnerabilities of our nation to cyber warfare, but why it has taken so long for our policy-makers to translate indifference into concern and concern into action. This is a vitally important book by a meticulous journalist.” (Ted Koppel, author of Lights Out: A Cyberattack, A Nation Unprepared, Surviving the Aftermath)

“A fascinating account of the people and organizations leading the way towards a cyber war future.” (Dorothy E. Denning, author of Information Warfare and Security, 1st Inductee, National Cyber Security Hall of Fame)

“A very in-depth work... its content is enlightening and intelligent and the secrets it uncovers are astounding.” (The News Hub)

“Everyone has heard the term 'cyber warfare.' Very few people could explain exactly what it means and why it matters. Dark Territory solves that problem with an account that is both fascinating and authoritative. Fred Kaplan has put the people, the technologies, the dramatic turning points, and the strategic and economic stakes together in a way no author has done before.” (James Fallows, national correspondent, The Atlantic)

“Chilling” (Haaretz)

“Revealing. . . . On a vital current-events topic, the well-connected Kaplan’s well-sourced history gives readers much to ponder.” (Booklist)

“One of the very best books ever written about the American military in the era of small wars . . . Fred Kaplan brings a formidable talent for writing intellectual history.” (The New York Review of Books)

“Excellent . . . An intellectual thriller.” (Time)

“Excellent . . . Poignant and timely . . . A good read, rich in texture and never less than wise.” (Foreign Policy)

“The best account to date of the history of cyber war…a human story: a history as revealed by the people involved in shaping it…full of detail, including information that will be new even to insiders.” (The Times Literary Supplement)

"It’s not easy to write an engaging book on cyberwar, and Kaplan, a national security columnist at Slate, has done an admirable job. He presents a clear account of the United States’ evolution into a formidable cyberpower, guiding the reader through a thicket of technical details and government acronyms." (Foreign Affairs)

About the Author
Fred Kaplan writes the War Stories column in Slate. He's also written about national security for the Atlantic, New York Times, New Yorker, New Republic, and others. He has a PhD from MIT and spent decades covering the Pentagon as a Pulitzer Prize-winning reporter. He lives in Brooklyn with his two daughters and his wife, NPR host Brooke Gladstone.

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Dark Territory CHAPTER 1 “COULD SOMETHING LIKE THIS REALLY HAPPEN?”
IT was Saturday, June 4, 1983, and President Ronald Reagan spent the day at Camp David, relaxing, reading some papers, then, after dinner, settling in, as he often did, to watch a movie. That night’s feature was WarGames, starring Matthew Broderick as a tech-whiz teenager who unwittingly hacks into the main computer at NORAD, the North American Aerospace Defense Command, and, thinking that he’s playing a

new computer game, nearly triggers World War III.

The following Wednesday morning, back in the White House, Reagan met with the secretaries of state, defense, and treasury, his national security staff, the chairman of the Joint Chiefs of Staff, and sixteen prominent members of Congress, to discuss a new type of nuclear missile and the prospect of arms talks with the Russians. But he couldn't get that movie out of his mind. At one point, he put down his index cards and asked if anyone else had seen it. Nobody had (it had just opened in theaters the previous Friday), so he launched into a detailed summary of its plot. Some of the legislators looked around the room with suppressed smiles or arched eyebrows. Not quite three months earlier, Reagan had delivered his "Star Wars" speech, calling on scientists to develop laser weapons that, in the event of war, could shoot down Soviet nuclear missiles as they darted toward America. The idea was widely dismissed as nutty. What was the old man up to now?

After finishing his synopsis, Reagan turned to General John Vessey, the chairman of the Joint Chiefs, the U.S. military's top officer, and asked, "Could something like this really happen?" Could someone break into our most sensitive computers?

Vessey, who'd grown accustomed to such queries, said he would look into it.

One week later, the general came back to the White House with his answer. WarGames, it turned out, wasn't at all far-fetched. "Mr. President," he said, "the problem is much worse than you think."

Reagan's question set off a string of interagency memos, working groups, studies, and meetings, which culminated, fifteen months later, in a confidential national security decision directive, NSDD-145, signed September 17, 1984, titled "National Policy on Telecommunications and Automated Information Systems Security."

It was a prescient document. The first laptop computers had barely hit the market, the first public Internet providers wouldn't come online for another few years. Yet the authors of NSDD-145 noted that these new devices—which government agencies and high-tech industries had started buying at a rapid clip—were "highly susceptible to interception, unauthorized electronic access, and related forms of technical exploitation." Hostile foreign intelligence agencies were "extensively" hacking into these services already, and "terrorist groups and criminal elements" had the ability to do so as well.

This sequence of events—Reagan's oddball question to General Vessey, followed by a pathbreaking policy document—marked the first time that an American president, or a White House directive, discussed what would come to be called "cyber warfare."

The commotion, for now, was short-lived. NSDD-145 placed the National Security Agency in charge of securing all computer servers and networks in the United States, and, for many, that went too far. The NSA was America's largest and most secretive intelligence agency. (Insiders joked that the initials stood for "No Such Agency.") Established in 1952 to intercept foreign communications, it was expressly forbidden from spying on Americans. Civil liberties advocates in Congress were not about to let a presidential decree blur this distinction.

And so the issue vanished, at least in the realm of high-level politics. When it reemerged a dozen years later, after a spate of actual cyber intrusions during Bill Clinton's presidency, enough time had passed that the senior officials of the day—who didn't remember, if they'd ever known of, NSDD-145—were shocked by the nation's seemingly sudden vulnerability to this seemingly brand-new threat.

When the White House again changed hands (and political parties) with the election of George W. Bush, the issue receded once more, at least to the public eye, especially after the terrorist attacks of September 11, 2001, which killed three thousand Americans. Few cared about hypothetical cyber wars when the nation was charging into real ones with bullets and bombs.

But behind closed doors, the Bush administration was weaving cyber war techniques with conventional war plans, and so were the military establishments of several other nations, friendly and otherwise, as the Internet spread to the globe's far-flung corners. Cyber war emerged as a mutual threat and opportunity, a tool of espionage and a weapon of war, that foes could use to hurt America and that America could use to hurt its foes.

During Barack Obama's presidency, cyber warfare took off, emerging as one of the few sectors of the defense budget that soared while others stayed stagnant or declined. In 2009, Obama's first secretary of defense, Robert Gates, a holdover from the Bush years, created a dedicated Cyber Command. In its first three years, the command's annual budget tripled, from $2.7 billion to $7 billion (plus another $7 billion for cyber activities in the military services, all told), while the ranks of its cyber attack teams swelled from 900 personnel to 4,000, with 14,000 foreseen by the end of the decade.

The cyber field swelled worldwide. By the midpoint of Obama's presidency, more than twenty nations had formed cyber warfare units in their militaries. Each day brought new reports of cyber attacks, mounted by China, Russia, Iran, Syria, North Korea, and others, against the computer networks of not just the Pentagon and defense contractors but also banks, retailers, factories, electric power grids, waterworks—everything connected to a computer network, and, by the early twenty-first century, that included nearly everything. And, though much less publicized, the United States and a few other Western powers were mounting cyber attacks on other nations' computer networks, too.

In one sense, these intrusions were nothing new. As far back as Roman times, armies intercepted enemy communications. In the American Civil War, Union and Confederate generals used the new telegraph machines to send false orders to the enemy. During World War II, British and American cryptographers broke German and Japanese codes, a crucial ingredient (kept secret for many years after) in the Allied victory. In the first few decades of the Cold War, American and Russian spies routinely intercepted each other's radio signals, microwave transmissions, and telephone calls, not just to gather intelligence about intentions and capabilities but, still more, to gain an advantage in the titanic war to come.

In other ways, though, information warfare took on a whole new dimension in the cyber age. Until the new era, the crews gathering SIGINT—signals intelligence—tapped phone lines and swept the skies for stray electrons, but that's all they could do: listen to conversations, retrieve the signals. In the cyber age, once they hacked a computer, they could prowl the entire network connected to it; and, once inside the network, they could not only read or download scads of information; they could change its content—disrupt, corrupt, or erase it—and mislead or disorient the officials who relied on it.

Once the workings of almost everything in life were controlled by or through computers—the guidance systems of smart bombs, the centrifuges in a uranium-enrichment lab, the control valves of a dam, the financial transactions of banks, even the internal mechanics of cars, thermostats, burglary alarms, toasters—hacking into a network gave a spy or cyber warrior the power to control those centrifuges, dams, and transactions: to switch their settings, slow them down, speed them up, or disable, even destroy them.

This damage was wreaked remotely; the attackers might be half a world away from the target. And unlike the atomic bomb or the intercontinental ballistic missile, which had long ago erased the immunity of distance, a cyber weapon didn’t require a large-scale industrial project or a campus of brilliant scientists; all it took to build one was a roomful of computers and a small corps of people trained to use them.

There was another shift: the World Wide Web, as it came to be called, was just that—a network stretched across the globe. Many classified programs ran on this same network; the difference was that their contents were encrypted, but this only meant that, with enough time and effort, they could be decrypted or otherwise penetrated, too. In the old days, if spies wanted to tap a phone, they put a device on a single circuit. In the cyber era, Internet traffic moved at lightning speed, in digital packets, often interspersed with packets containing other people’s traffic, so a terrorist’s emails or cell phone chatter couldn’t be extracted so delicately; everyone’s chatter and traffic got tossed in the dragnet, placed, potentially, under the ever-watchful eye.

The expectation arose that wars of the future were bound to be, at least in part, cyber wars; cyberspace was officially labeled a “domain” of warfare, like air, land, sea, and outer space. And because of the seamless worldwide network, the packets, and the Internet of Things, cyber war would involve not just soldiers, sailors, and pilots but, inexorably, the rest of us. When cyberspace is everywhere, cyber war can seep through every digital pore.

During the transitions between presidents, the ideas of cyber warfare were dismissed, ignored, or forgotten, but they never disappeared. All along, and even before Ronald Reagan watched WarGames, esoteric enclaves of the national-security bureaucracy toiled away on fixing—and, still more, exploiting—the flaws in computer software.

General Jack Vessey could answer Reagan’s question so quickly—within a week of the meeting on June 8, 1983, where the president asked if someone could really hack the military’s computers, like the kid in that movie—because he took the question to a man named Donald Latham. Latham was the assistant secretary of defense for command, control, communications, and intelligence—ASD(C3I), for short—and, as such, the Pentagon’s liaison with the National Security Agency, which itself was an extremely secret part of the Department of Defense. Spread out among a vast complex of shuttered buildings in Fort Meade, Maryland, surrounded by armed guards and high gates, the NSA was much larger, better funded, and more densely populated than the more famous Central Intelligence Agency in Langley, Virginia. Like many past (and future) officials in his position, Latham had once worked at the NSA, still had contacts there, and knew the ins and outs of signals intelligence and how to break into communications systems here and abroad.

There were also top secret communications-intelligence bureaus of the individual armed services: the Air Intelligence Agency (later called the Air Force Information Warfare Center) at Kelly Air Force Base in San Antonio, Texas; the 609th Information Warfare Squadron at Shaw Air Force Base in Sumter, South Carolina; scattered cryptology labs in the Navy; the CIA’s Critical Defense Technologies Division; the Special Technological Operations Division of J-39, a little known office in the Pentagon’s Joint Staff (entry required dialing the combination locks on two metal doors). They all fed to and from the same centers of beyond-top-secret wizardry, some of it homegrown, some manufactured by ESL, Inc. and other specialized private contractors. And they all interacted, in one way or another, with the NSA.

When Reagan asked Vessey if someone could really hack into the military’s computers, it was far from the first time the question had been asked. To those who would write NSDD-145, the question was already very old, as old as the Internet itself.

In the late 1960s, long before Ronald Reagan watched WarGames, the Defense Department undertook a program called the ARPANET. Its direct sponsor, ARPA (which stood for Advanced Research Projects

Agency), was in charge of developing futuristic weapons for the U.S. military. The idea behind ARPANET was to let the agency's contractors—scientists at labs and universities across the country—share data, papers, and discoveries on the same network. Since more and more researchers were using computers, the idea made sense. As things stood, the director of ARPA had to have as many computer consoles in his office as there were contractors out in the field, each hooked up to a separate telephone modem—one to communicate with UCLA, another with the Stanford Research Institute, another with the University of Utah, and so forth. A single network, linking them all, would not only be more economical, it would also let scientists around the country exchange data more freely and openly; it would be a boon to scientific research.

In April 1967, shortly before ARPANET's rollout, an engineer named Willis Ware wrote a paper called "Security and Privacy in Computer Systems" and delivered it at the semiannual Joint Computer Conference in New York City. Ware was a pioneer in the field of computers, dating back to the late 1940s, when there barely was such a field. At Princeton's Institute for Advanced Studies, he'd been a protégé of John von Neumann, helping design one of the first electrical computers. For years now, he headed the computer science department at the RAND Corporation, an Air Force–funded think tank in Santa Monica, California. He well understood the point of ARPANET, lauded its goals, admired its ambition; but he was worried about some implications that its managers had overlooked.

In his paper, Ware laid out the risks of what he called "resource-sharing" and "on-line" computer networks. As long as computers stood in isolated chambers, security wouldn't be a problem. But once multiple users could access data from unprotected locations, anyone with certain skills could hack into the network—and after hacking into one part of the network, he could roam at will.

Ware was particularly concerned about this problem because he knew that defense contractors had been asking the Pentagon for permission to store classified and unclassified files on a single computer. Again, on one level, the idea made sense: computers were expensive; commingling all the data would save lots of money. But in the impending age of ARPANET, this practice could prove disastrous. A spy who hacked into unclassified networks, which were entirely unprotected, could find "back doors" leading to the classified sections. In other words, the very existence of a network created sensitive vulnerabilities; it would no longer be possible to keep secrets.

Stephen Lukasik, ARPA's deputy director and the supervisor of the ARPANET program, took the paper to Lawrence Roberts, the project's chief scientist. Two years earlier, Roberts had designed a communications link, over a 1200-baud phone line, between a computer at MIT's Lincoln Lab, where he was working at the time, and a colleague's computer in Santa Monica. It was the first time anyone had pulled off the feat: he was, in effect, the Alexander Graham Bell of the computer age. Yet Roberts hadn't thought about the security of this hookup. In fact, Ware's paper annoyed him. He begged Lukasik not to saddle his team with a security requirement: it would be like telling the Wright brothers that their first airplane at Kitty Hawk had to fly fifty miles while carrying twenty passengers. Let's do this step by step, Roberts said. It had been hard enough to get the system to work; the Russians wouldn't be able to build something like this for decades.

He was right; it would take the Russians (and the Chinese and others) decades—about three decades—to develop their versions of the ARPANET and the technology to hack into America's. Meanwhile, vast systems and networks would sprout up throughout the United States and much of the world, without any provisions for security.

Over the next forty years, Ware would serve as a consultant on government boards and commissions dealing with computer security and privacy. In 1980, Lawrence Lasker and Walter Parkes, former Yale classmates in their late twenties, were writing the screenplay for the film that would come to be called WarGames. They were uncertain about some of the plotline’s plausibility. A hacker friend had told them about “demon-dialing” (also called “war-dialing”), in which a telephone modem searched for other nearby modems by automatically dialing each phone number in a local area code and letting it ring twice before moving on to the next number. If a modem answered, it would squawk; the demon-dialing software would record that number, and the hacker would call it back later. (This was the way that early computer geeks found one another: a pre-Internet form of web trolling.) In the screenplay, this was how their whiz-kid hero breaks into the NORAD computer. But Lasker and Parkes wondered whether this was possible: wouldn’t a military computer be closed off to public phone lines?

Lasker lived in Santa Monica, a few blocks from RAND. Figuring that someone there might be helpful, he called the public affairs officer, who put him in touch with Ware, who invited the pair to his office.

They’d found the right man. Not only had Ware long known about the myriad vulnerabilities of computer networks, he’d helped design the software program at NORAD. And for someone so steeped in the world of big secrets, Ware was remarkably open, even friendly. He looked like Jiminy Cricket from the Disney cartoon film of Pinocchio, and he acted a bit like him, too: excitable, quick-witted, quick to laugh.

Listening to the pair’s questions, Ware waved off their worries. Yes, he told them, the NORAD computer was supposed to be closed, but some officers wanted to work from home on the weekend, so they’d leave a port open. Anyone could get in, if the right number was dialed. Ware was letting the fledgling screenwriters in on a secret that few of his colleagues knew. The only computer that’s completely secure, he told them with a mischievous smile, is a computer that no one can use.

Ware gave Lasker and Parkes the confidence to move forward with their project. They weren’t interested in writing sheer fantasy; they wanted to imbue even the unlikeliest of plot twists with a grain of authenticity, and Ware gave them that. It was fitting that the scenario of WarGames, which aroused Ronald Reagan’s curiosity and led to the first national policy on reducing the vulnerability of computers, was in good part the creation of the man who’d first warned that they were vulnerable.

Ware couldn’t say so, but besides working for RAND, he also served on the Scientific Advisory Board of the National Security Agency. He knew the many ways in which the NSA’s signals intelligence crews were piercing the shields—penetrating the radio and telephone communications—of the Russian and Chinese military establishments. Neither of those countries had computers at the time, but ARPANET was wired through dial-up modems—through phone lines. Ware knew that Russia or China could hack into America’s phone lines, and thus into ARPANET, with the same bag of tricks that America was using to hack into their phone lines.

In other words, what the United States was doing to its enemies, its enemies could also do to the United States—maybe not right now, but someday soon.

The National Security Agency had its roots in the First World War. In August 1917, shortly after joining the fight, the United States government created Military Intelligence Branch 8, or MI-8, devoted to deciphering German telegraph signals. The unit stayed open even after the war, under the dual auspices of the war and state departments, inside an inconspicuous building in New York City that its denizens called the Black Chamber. The unit, whose cover name was the Code Compilation Company, monitored communications of suspected subversives; its biggest coup was persuading Western Union to provide access to all the telegrams coming over its wires. The Black Chamber was finally shut down in 1929, after Secretary of State Henry Stimson proclaimed, “Gentlemen don’t read each other’s mail.” But the practice was revived, with the outbreak of World War II, as the Signal Security Agency, which, along with British counterparts, broke the codes of German and Japanese communications—a feat that helped the Allies win the war. Afterward, it morphed into the Army Security Agency, then the multiservice Armed Forces Security Agency, then in 1952—when President Harry Truman realized the services weren't cooperating with one another—a unified code-breaking organization called the National Security Agency.

Throughout the Cold War, the NSA set up bases around the world—huge antennas, dishes, and listening stations in the United Kingdom, Canada, Japan, Germany, Australia, and New Zealand—to intercept, translate, and analyze all manner of communications inside the Soviet Union. The CIA and the Air Force flew electronic-intelligence airplanes along, and sometimes across, the Soviet border, picking up signals as well. In still riskier operations, the Navy sent submarines, equipped with antennas and cables, into Soviet harbors.

In the early years of the Cold War, they were all listening mainly to radio signals, which bounced off the ionosphere all around the globe; a powerful antenna or large dish could pick up signals from just about anyplace. Then, in the 1970s, the Russians started switching to microwave transmissions, which beamed across much shorter distances; receivers had to be in the beam's line of sight to intercept it. So the NSA created joint programs, sending spies from the CIA or other agencies across enemy lines, mainly in the Warsaw Pact nations of Eastern Europe, to erect listening posts that looked like highway markers, telephone poles, or other mundane objects.

Inside Moscow, on the tenth floor of the American embassy, the NSA installed a vast array of electronic intelligence gear. In a city of few skyscrapers, the tenth floor offered a panoramic view. Microwave receivers scooped up phone conversations between top Soviet officials—including Chairman Leonid Brezhnev himself—as they rode around the city in their limousines.

The KGB suspected something peculiar was going on up there. On January 20, 1978, Bobby Ray Inman, the NSA director, was awakened by a phone call from Warren Christopher, the deputy secretary of state. A fire had erupted in the Moscow embassy, and the local fire chief was saying he wouldn't put it out unless he was given access to the tenth floor. Christopher asked Inman what he should do.

Inman replied, "Let it burn." (The firefighters eventually put it out anyway. It was one of several fires that mysteriously broke out in the embassy during that era.)

By 1980, the last full year of Jimmy Carter's presidency, the American spy agencies had penetrated the Soviet military machine so deeply, from so many angles, that analysts were able to piece together a near-complete picture of its operations, patterns, strengths, and weaknesses. And they realized that, despite its enormous buildup in troops and tanks and missiles, the Soviet military was extremely vulnerable.

The fatal gaps lay in the communications links of its command-control systems—the means by which radar operators tracked incoming planes and missiles, general officers sent out orders, and Kremlin higher-ups decided whether to go to war. And once American SIGINT crews were inside Soviet command-control, they could not only learn what the Russians were up to, which was valuable enough; they could also insert false information, disrupt the command signals, even shut them off. These disruptions might not win a war by themselves, but they could tip the balance, sowing confusion among Soviet officers, making them distrust the intelligence they were seeing and the orders they were receiving—which, in the best of scenarios, might stop them from launching a war in the first place.

The Russians, by now, had learned to encrypt their most vital command-control channels, but the NSA figured out how to break the codes, at least some of them. When cryptologists of whatever nationality coded a signal, they usually made a mistake here and there, leaving some passages in plain text. One way to break the code was to find the mistake, work backward to see how that passage—say, an often-used greeting or routine military jargon—had been encrypted in previous communiqués, then unravel the code from there.

Bobby Ray Inman had been director of naval intelligence before he took over the NSA in 1977, at the start of President Carter's term. Even back then, he and his aides had fiddled with encryption puzzles. Now with the NSA's vast secret budget at his disposal, Inman went at the task with full steam. In order to compare encrypted passages with mistakes in the clear, he needed machines that could store a lot of data and process it at high speed. For many years, the NSA had been building computers—vast corridors were filled with them—but this new task exceeded their capacity. So, early on in his term as director, Inman started a program called the Bauded Signals Upgrade, which involved the first "supercomputer." The machine cost more than a billion dollars, and its usefulness was short-lived: once the Soviets caught on that their codes had been broken, they would devise new ones, and the NSA code breakers would have to start over. But for a brief period of Russian obliviousness, the BSU helped break enough high-level codes that, combined with knowledge gained from other penetrations, the United States acquired an edge—potentially a decisive edge—in the deadliest dimension of the Cold War competition.

Inman had a strong ally in the Pentagon's top scientist, William Perry. For a quarter century, Perry had immersed himself in precisely this way of thinking. After his Army service at the end of World War II, Perry earned advanced degrees in mathematics and took a job at Sylvania Labs, one of the many high-tech defense contractors sprouting up in Northern California, the area that would later be called Silicon Valley. While many of these firms were designing radar and weapons systems, Sylvania specialized in electronic countermeasures—devices that jammed, diffracted, or disabled those systems. One of Perry's earliest projects involved intercepting the radio signals guiding a Soviet nuclear warhead as it plunged toward its target, then altering its trajectory, so the warhead swerved off course. Perry figured out a way to do this, but he told his bosses it wouldn't be of much use, since Soviet nuclear warheads were so powerful—several megatons of blast, to say nothing of thermal heat and radioactive fallout—that millions of Americans would die anyway. (This experience led Perry, years later, to become an outspoken advocate of nuclear arms-reduction treaties.)

Still, Perry grasped a key point that most other weapons scientists of the day did not: that getting inside the enemy's communications could drastically alter the effect of a weapon—and maybe the outcome of a battle or a war.

Perry rose through the ranks of Sylvania, taking over as director in 1954, then ten years later he left to form his own company, Electromagnetic Systems Laboratory, or ESL, which did contract work almost exclusively for the NSA and CIA. By the time he joined the Pentagon in 1977, he was as familiar as anyone with the spy agencies' advances in signals intelligence; his company, after all, had built the hardware that made most of those advances possible.

It was Perry who placed these scattershot advances under a single rubric: "counter-C2 warfare," the "C2" standing for "command and control." The phrase derived from his longtime preoccupation with electronic countermeasures, for instance jamming an enemy jet's radar receiver. But while jammers gave jets a tactical edge, counter-C2 warfare was a strategic concept; its goal was to degrade an enemy commander's ability to wage war. The concept regarded communications links—and the technology to intercept, disrupt, or sever them—not merely as a conveyor belt of warfare but as a decisive weapon in its own right.

When Jimmy Carter was briefed on these strategic breakthroughs, he seemed fascinated by the technology. When his successor, the Cold War hawk Ronald Reagan, heard the same briefing a year later, he evinced little interest in the technical details, but was riveted to the big picture: it meant that if war broke out between the superpowers, as many believed likely, the United States could win, maybe quickly and decisively.

In his second term as president, especially after the reformer Mikhail Gorbachev took over the Kremlin, Reagan rethought the implications of American superiority: he realized that his military's aggressive tactics and his own brazen rhetoric were making the Russians jumpy and the world more dangerous; so he softened his rhetoric, reached out to Gorbachev, and the two wound up signing a string of historic arms-reduction treaties that nearly brought the Soviet Union—the "evil empire," as Reagan had once described it—into the international order. But during his first term, Reagan pushed hard on his advantage, encouraging the NSA and other agencies to keep up the counter-C2 campaign.

Amid this pressure, the Russians didn't sit passive. When they found out about the microwaves emanating from the U.S. embassy's tenth floor, they started beaming its windows with their own microwave generators, hoping to listen in on the American spies' conversations.

The Russians grew clever at the spy-counterspy game. At one point, officials learned that the KGB was somehow stealing secrets from the Moscow embassy. The NSA sent over an analyst named Charles Gandy to solve the mystery. Gandy had a knack for finding trapdoors and vulnerabilities in any piece of hardware. He soon found a device called the Gunman inside sixteen IBM Selectric typewriters, which were used by the secretaries of high-level embassy officials. The Gunman recorded every one of their keystrokes and transmitted the data to a receiver in a church across the street. (Subsequent probes revealed that an attractive Russian spy had lured an embassy guard to let her in.)

It soon became clear that the Russians were setting up microwave beams and listening stations all over Washington, D.C., and New York City. Senior Pentagon officials—those whose windows faced high buildings across the Potomac River—took to playing Muzak in their offices while at work, so that if a Russian spy was shooting microwaves at those windows, it would clutter the ambient sound, drowning out their conversations.

Bobby Ray Inman had his aides assess the damage of this new form of spying. President Carter, a technically sophisticated engineer (he loved to examine the blueprints of the military's latest spy satellites), had been assured that his phone conversations, as well as those of the secretaries of state and defense, were carried on secure landlines. But NSA technicians traced those lines and discovered that, once the signal reached Maryland, it was shunted to microwave transmitters, which were vulnerable to interception. There was no evidence the Soviets were listening in, but there was no reason to think they weren't; they certainly could be, with little difficulty.

It took a while, but as more of these vulnerabilities were discovered, and as more evidence emerged that Soviet spies were exploiting them, a disturbing thought smacked a few analysts inside NSA: Anything we're doing to them, they can do to us.

This anxiety deepened as a growing number of corporations, public utilities, and government contractors started storing data and running operations on automated computers—especially since some of them were commingling classified and unclassified data on the same machines, even the same software. Willis Ware's warnings of a dozen years earlier were proving alarmingly prophetic.

Not everyone in the NSA was troubled. There was widespread complacency about the Soviet Union: doubt, even derision at the idea, that a country so technologically backward could do the remarkable things that America's SIGINT crews were doing. More than that, to the extent computer hardware and software had security holes, the NSA’s managers were reluctant to patch them. Much of this hardware and software was used (or copied) in countries worldwide, including the targets of NSA surveillance; if it could easily be hacked, so much the better for surveillance.

The NSA had two main directorates: Signals Intelligence and Information Security (later called Information Assurance). SIGINT was the active, glamorous side of the puzzle palace: engineers, cryptologists, and old-school spies, scooping up radio transmissions, tapping into circuits and cables, all aimed at intercepting and analyzing communications that affected national security. Information Security, or INFOSEC, tested the reliability and security of the hardware and software that the SIGINT teams used. But for much of the agency’s history, the two sides had no direct contact. They weren’t even housed in the same building. Most of the NSA, including the SIGINT Directorate, worked in the massive complex at Fort Meade, Maryland. INFOSEC was a twenty-minute drive away, in a drab brown brick building called FANEX, an annex to Friendship Airport, which later became known as BWI Marshall Airport. (Until 1968, INFOSEC had been still more remote, in a tucked-away building—which, many years later, became the Department of Homeland Security headquarters—on Nebraska Avenue, in Northwest Washington.) INFOSEC technicians had a maintenance function; they weren’t integrated into operations at all. And the SIGINT teams did nothing but operations; they didn’t share their talents or insights to help repair the flaws in the equipment they were monitoring.

These two entities began to join forces, just a little, toward the end of Carter’s presidency. Pentagon officials, increasingly aware that the Soviets were penetrating their communications links, wanted INFOSEC to start testing hardware and software used not only by the NSA but by the Defense Department broadly. Inman set up a new organization, called the Computer Security Center, and asked his science and technology chief, George Cotter, to direct it. Cotter was one of the nation’s top cryptologists; he’d been doing signals intelligence since the end of World War II and had worked for the NSA from its inception. Inman wanted the new center to start bringing together the SIGINT operators and the INFOSEC technicians on joint projects. The cultures would remain distinct for years to come, but the walls began to give.

The order to create the Computer Security Center came from the ASD(C3I), the assistant secretary of defense for command, control, communications, and intelligence—the Pentagon’s liaison with the NSA. When Reagan became president, his defense secretary, Caspar Weinberger, appointed Donald Latham to the position. Latham had worked SIGINT projects with George Cotter in the early to mid-1970s on the front lines of the Cold War: Latham as chief scientist of U.S. European Command, Cotter as deputy chief of NSA-Europe. They knew, as intimately as anyone, just how deeply both sides—the Soviets and the Americans (and some of their European allies, too)—were getting inside each other’s communications channels. After leaving NSA, Latham was named deputy chief of the Pentagon’s Office of Microwave, Space and Mobile Systems—and, from there, went on to work in senior engineering posts at Martin Marietta and RCA, where he remained immersed in these issues.

When General Jack Vessey came back from that White House meeting after Ronald Reagan had watched WarGames and asked his aides to find out whether someone could hack into the military’s most sensitive computers, it was only natural that his staff would forward the question to Don Latham. It didn’t take long for Latham to send back a response, the same response that Vessey would deliver to the president: Yes, the problem is much worse than you think.

Latham was put in charge of working up, and eventually drafting, the presidential directive called NSDD-145. He knew the various ways that the NSA—and, among all federal agencies, only the NSA—could not only hack but also secure telecommunications and computers. So in his draft, he put the NSA in charge of all their security.

The directive called for the creation of a National Telecommunications and Information Systems Security Committee “to consider technical matters” and “develop operating policies” for implementing the new policy. The committee’s chairman would be the ASD(C3I)—that is to say, the chairman would be Don Latham.

The directive also stated that residing within this committee would be a “permanent secretariat composed of personnel of the National Security Agency,” which “shall provide facilities and support as required.” There would also be a “National Manager for Telecommunications and Automated Information Systems Security,” who would “review and approve all standards, techniques, systems, and equipments.” The directive specified that this National Manager would be the NSA director.

It was an ambitious agenda, too ambitious for some. Congressman Jack Brooks, a Texas Democrat and Capitol Hill’s leading civil-liberties advocate, wasn’t about to let the NSA—which was limited, by charter, to surveillance of foreigners—play any role in the daily lives of Americans. He wrote, and his fellow lawmakers passed, a bill that revised the president’s directive and denied the agency any such power. Had Don Latham’s language been left standing, the security standards and compliance of every computer in America—government, business, and personal—would have been placed under the tireless gaze of the NSA.

It wouldn’t be the last time that the agency tried to assert this power—or that someone else pushed back.