The Story of the National Cryptologic Museum

Ensuring the Legacy

Jack E. Ingram

On 16 December 1993, the National Cryptologic Museum (NCM) opened its doors to the public, displaying signals intercept artifacts dating from the early 16th century to the modern era. The museum has become an important part of the National Security Agency's efforts over the past decade to put a new face on this ultra-secret part of the Intelligence Community and improve understanding of the Agency's challenges and triumphs over the years.

Curator Jerry Coates and then-Director of NSA Lt. Gen. Lincoln D. Faurer during

A Long Journey

The museum's journey began more than 50 years ago during World War II. As combat intensified, so did the intelligence war. Captured Axis cryptographic equipment and materiel were examined and reverse engineered by the Army and Navy signal security services. After the war, the Army's holdings were designated as the Research and Development Museum Collection (RDM). The World War II artifacts were augmented by cryptographic devices from the 19th and early 20th centuries. When the National Security Agency (NSA) was formed in November 1952, it inherited the RDM, which is still the core of the Cryptologic Museum's collection.

In NSA's early years, legendary cryptologists William F. Friedman and Lambros Callimahos developed an abiding interest in cryptologic history and the RDM collection. Callimahos even set up a small "museum" next to his office at NSA, which he showed to privileged visitors. Thanks in part to the efforts of these two pioneers, the collection was kept intact well into the 1970s.

In the late 1970s and throughout the 1980s, the curator of the collection, Earl J. "Jerry" Coates, designed and placed exhibits in the lobby of NSA's headquarters. These early displays covered such diverse subjects as the Enigma cipher machine, NSA's rare book collection, signals intelligence in the American Civil War, the Radio Intelligence Service of 1918–1919, cryptologic support for D-Day, and more. The success of the exhibits inspired Coates to begin to push for establishment of a true museum for NSA.

With the support of NSA director Vice Adm. Bobby Ray Inman, Coates loaned the Smithsonian's Museum of American History several early-20th century and World War II cipher machines used by the Allied and Axis powers and helped install the museum's exhibit in 1981. This marked the first time that NSA had ventured into the public arena. Coates later loaned what is thought to be the last surviving US Navy cryptanalytic Bombe—a precursor to the computer used to recover Enigma keys in World War II—to the Smithsonian. The Bombe, which had been on exhibit at NSA

since 1985, became the centerpiece of the Museum of American History's new exhibit on The Information Age.

At the end of the decade, NSA director Vice Adm. William O. Studeman established the Center for Cryptologic History (CCH) and appointed David W. Gaddy as director. Gaddy shared Coates's desire to open a museum within the Agency that would combine classified and unclassified exhibits for the education and enjoyment of NSA employees and distinguished visitors. But no suitable space could be spared within the NSA complex.

Finding a Home

Fortuitously, in May 1990, NSA purchased a small property adjacent to Fort Meade. The site included a former motel, which consisted of offices, a restaurant and dinner theater, and four two-story bedroom buildings. CCH bid on using the new facility, along with a number of other NSA components. A breakthrough came when Adm. Studeman made an off-the-cuff remark about the possibility of using the motel as a museum in the course of a speech to the Baltimore-Washington Corridor Chamber of Commerce in June. The audience, composed of state and county officials and business leaders, was excited by this idea and the Chamber followed up with a letter pointing out the advantages of a museum and promising support.

The public surfacing of the concept obliged NSA leadership to take CCH's proposal seriously. Gaddy advocated forcefully, arguing that the museum would not simply be a display of "ancient history," but would serve the educational needs of the day and present "an idea of the challenges for the future." In September, CCH received a green light for use of part of the facility. A working group was formed to iron out the details of funding, staffing, access, operations, and parking. The motel complex would not be secured for storage of classified material, so museum exhibits would have to be unclassified. That opened up the possibility of public admission for the first time.

From Dream to Reality

Jerry Coates moved into a small office on the motel site to begin planning exhibits for the museum in August 1991. Not long after, he brought me over from the National Cryptologic School to be assistant curator. For about 18 months, while the building's interior was gutted and reconfigured, Jerry and I made plans and dreamed dreams about what to include in our new museum. One burning question bandied about during that time was what to name the museum. We received numerous suggestions, including "Codes R Us!" I leaned toward "The National Cryptologic Museum," as we were after all a national-level agency and cryptology was our business. Since no one objected, Coates and I just used the name, and it stuck.

Our task was daunting: We were to build a museum without a procurement budget! Other than facility support and our salaries, we had no funding to speak of. We could count on the main NSA Graphics Department providing graphics support at no cost to us, but we could not start a museum without exhibit cases for displaying and protecting our artifacts. Fortunately, Jerry made a phone call to a friend at the Smithsonian at just the right time. The Museum of African Art had some used exhibit cases to give away, and we were the first to ask for them. All we had to do was select the cases we wanted (we took them all) and move them ourselves, which we managed to do in fairly short order. In addition, the Historical Electronics Museum in Linthicum, Maryland, gave us three large cases. After some minor repairs, these cases, too, were ready, and we were all set to go forward.

By mid-April 1993, the museum building was completed, and two members of the NSA Graphics Display Team moved in with Coates and me to begin designing and installing exhibits. [1]   The exhibits were fabricated on sheets of plywood supported by sawhorses set up in what had been the motel kitchen. Occasionally globs of grease would fall out of the old exhaust fans and onto our work in progress. While the four of us designed, fabricated, and put in exhibits, another man cleaned and restored the old cipher machines that we were going to exhibit. [2]

The National Cryptologic Museum opened its doors on 15 July 1993. Initially, entrance was limited to NSA employees and their families and to other members of the Intelligence Community. We used the first few months to fine-tune our exhibits and to get used to giving tours and answering questions.

The main exhibit room as it looked when the museum opened for employees and families in July 1993.

Finally, in December, the general public was invited in. A small reception was held that evening with officials from the Baltimore-Washington Corridor Chamber of Commerce, Fort Meade, and the Smithsonian in attendance. Since there was no press release on the event, however, the public did not really know that we were open. After all, NSA was not known as "No Such Agency" for nothing, and it was really just beginning to feel its way in the public affairs arena. But with the opening of the NCM, that would change, and sooner than anyone would have thought.

The Washington Post broke the story on 24 January 1994, thanks to staff writer Ken Ringle, who had learned about the museum from David Kahn, author of the groundbreaking book *The Codebreakers*. Ringle's article, titled "Only Sleuths Can Find This Museum," filled the entire bottom half of the front page. The article included a photograph of the curator looking much like a college professor, standing next to a World War II cipher machine. Ringle's article was complimentary, while poking some fun at us at the same time. In his last paragraph, he wrote: "Some at NSA say you can

reach [the museum] at 301-688-5849. Others at NSA deny that number exists." Of course the article was syndicated throughout the nation, and beginning at about 8 a.m. that morning, our telephone rang every five minutes for the next several days. The word was out! The tempo picked up fast, with visitors beginning to walk in and people calling to schedule tours.

Media Attention

NCM Curator Jack Ingram.

With the museum underway, Jerry Coates retired and I moved into the hot seat—and it was getting warmer every day. We always believed that the museum would be a success, but we did not anticipate how quickly that success would come about. Over the first six months, we had several thousand visitors. I gave dozens of tours, with David Hatch, the new chief of the CCH, lending a hand when needed. Our first scheduled public tour was for the "Sisters in Crime," a club for local mystery writers. They were a lot of fun and appreciated the tour.

We added staff, and, with authorization from DoD, I began to draw in retired NSA personnel as museum volunteers. [3]   Volunteers still help with tours and organizing and cataloging our ever-growing library collection. The volunteer program has been critical to the success of the museum.

Federal and private museums often request cryptologic items and we began to develop a more aggressive loan program. The U–505 German submarine that is on permanent exhibit at the Museum of Science and Industry in Chicago is a good example—the Enigma machine that was actually used on the U–505 is on loan from our museum. At present, we have approximately 20 Enigmas and many other items on loan in about a dozen locations.

The real shock to us all was the unprecedented media attention precipitated by the article in *The Washington Post*. In February 1994, FOX 5 News of Washington, DC, became the first TV crew to tape inside NSA. They filmed me giving a short tour and then conducted an interview for the 10 p.m. news. What the people watching TV that night did not see were Judith Emmel, chief of NSA's Public and Media Affairs Office, and my boss, Dave Hatch, standing about 2 feet off camera waiting to intercede if needed. The session went fine, however, and the FOX 5 coverage turned out to be positive both for the museum and, more importantly, for NSA. Nonetheless, it was surrealistic, to say the least, to find myself appearing on television after a lifetime of working at NSA in almost complete anonymity.

Over the next few months, we were inundated with requests to film exhibits and interview staff at the museum. The requestors ranged from the local Baltimore network affiliates to film crews from Canada, Germany, France, Spain, and Japan. We also had major radio attention, including from NPR and the CBS program "The Osgood File." These programs were

all great publicity for the museum and treated NSA in a favorable light.

Not to be left behind, the print media also came to do interviews and photo shoots. These included *The Wall Street Journal*, the *Washington Times*, and other US papers, as well as European publications such as *Die Zeit* and *Paris Match*. Print media reporters often arrived with an ax to grind or an attitude of mistrust toward NSA. By the time the interviews were over, however, they usually had come to realize that we were not what they perceived us to be and went on to write favorable articles on the Agency and the NCM. The knowledge that we were breaking new ground in lessening some of the mistrust and anti-NSA bias of the media gave me much personal satisfaction.

Over the years, media attention has remained high. My personal favorite was a History Channel program called "History's Mysteries." The one-hour program was filmed in August 2000 and aired in January 2001. Titled "NSA: America's Most Secret Agency," it was an excellent mix of historical cryptologic success stories, present-day operations, and commentary on the value of NSA's contributions to national security. The people interviewed included NSA historian Dave Hatch, me, as the curator of the NCM, retired NSA notables, and Agency leaders, such as current director Lt. Gen. Michael V. Hayden. Also appearing on camera was well-known author James Bamford, who has written two books on NSA, *The Puzzle Palace* and *Body of Secrets*.

Visitors Famous and Infamous

In the mid-1990s, we gained space and expanded exhibits. I had an interactive STU-III secure phone set up (using a test key) in the room for visitors so that they could experience using a "scramble phone." The set up did not last long, as it was not childproof! While the system was in operation, however, we had a visit from Lt. Gen. Ivan Milkuan, chief of the Russian Army's Personnel Directorate, who toured in uniform. We had a photographer covering the visit, and a photograph of the general speaking on a STU-III later caused considerable consternation when shown to our deputy director for information security. Upon leaving, the general presented us with a piece of Francis Gary Powers's U-2, shot down over the Soviet Union on 1 May 1960.

Another unique visitor in those early years was the last director of the KGB, Gen. Victor Ivanenkov. Now a capitalist, Ivanenkov was running his own security firm in Moscow, with Exxon oil as a client—and it was Exxon that set up the tour. At the time, we had a small exhibit on the KGB museum in Moscow, featuring a photograph of Lubyanka Prison, the former headquarters of the KGB. Gen. Ivanenkov delighted in pointing out the window of the office from which he ran the KGB!

In 1994, the eminent astronomer Carl Sagan paid us a short visit after giving a presentation inside the Agency. He had only about 15 minutes to spare, but he spent ten of those minutes playing with our hands-on, World War II-vintage Enigma cipher machine. I think he was amazed that he could not predict the outcome of the cipher text. Nevertheless, he thoroughly enjoyed himself and entertained us as well.

I fondly recall the day in early 1998 when Tom Rowlett walked into my office. Tom was the son of Frank Rowlett, who had led the team that solved the Japanese Purple Machine, breaking the Japanese code in the 1940s. [4] With a big smile on his face, Rowlett handed me a small box containing an old solenoid switch, saying, "Pop said you would know what this is." The solenoid switch had been used in the original Purple Analog—the machine designed to decipher Japanese messages had not functioned properly until the team's electrical engineer, Leo Rosen, wired this fifteen-cent switch into the circuitry. I could not have been more surprised. I had spoken with Frank Rowlett on the telephone numerous times, and he had visited the museum for a private tour in 1997, but he had never mentioned to me that he still had the little switch. Since then, it has become an invaluable piece of our collection.

During a visit to the NCM in June 1997,
Frank Rowlett stood by the MAGIC exhibit,
which explains how his team broke the Japanese code.

Of the many distinguished visitors we have had at the NCM, my personal
favorite is Apollo 13 commander James Lovell. The NSA deputy chief
scientist who accompanied Lovell had arranged a 30-minute tour before

he was to meet with the director. Lovell was unassuming, friendly, articulate, and inquisitive. In fact, he was so interested and had so many questions that he stayed longer than planned and was late for his meeting with the director. As he was leaving, he graciously signed a handful of museum brochures for the staff. This was the only time I have ever been moved to make such a request of a visitor.

Renaissance

By 1996, the museum was out of space for new exhibits and badly in need of repairs and further renovations. Surrounded by a fence topped with barbed wire and lacking road signs and a decent parking lot, the site was hardly appealing and visitor-friendly. We still had no budget, however, and my requests for the many needed improvements fell on deaf ears. It was quite discouraging.

All this changed when Lt. Gen. Kenneth A. Minihan, USAF, became the 14th director of the National Security Agency in March 1996. Gen. Minihan liked museums. When told that NSA already had a museum, he is reputed to have commented: "But it has to pass the Minihan test!" It was not long before he came over to see us. Dave Hatch and I were prepared to give a short tour of the museum, but instead Minihan walked through the building with us in his wake. He asked questions and made comments for about 15 minutes and then began giving orders. He said he wanted a "21st-century museum," and he wanted the needed repairs completed quickly. He told us that he was going to begin holding evening receptions and dinners in the museum, and that the first one would be in six weeks! Before leaving he turned to me: Poking his finger at my stomach, he said, "You now own the whole building." My mouth fell open in disbelief, so he repeated his statement, adding that he wanted a three-year expansion plan from Hatch and me in 30 days. Following this tour, a memo was circulated which clarified that Minihan wanted immediate improvements made to the museum facility and that "Dave Hatch and Jack Ingram are speaking for the director in this matter." Salvation was at hand!

Thanks to the director's interest and support, I began getting phone calls and visits from facility managers asking what I needed and in what priority. The repairs were taken care of in a few weeks, including an

priority   ep   cluding a overhaul of the heating and air-conditioning system. Within a few more weeks, the road and parking lot were resurfaced. The fence was removed, trees were planted along the entrance road, and several large museum signs were placed on roads leading to the museum.

During the summer and fall of 1996, the director and other Agency officials hosted about a dozen evening dinners and social events. Normally, a short tour was provided to the guests, tailored to their particular areas of interest. Over succeeding years, the popularity of these events grew, with an average of 40 evening events being held at the NCM annually.

Gen. Minihan also gave a nod to the establishment of the National Cryptologic Museum Foundation (NCMF), with a supporting cast drawn from among the most distinguished former senior officials of NSA. [5]   The NCMF purchases artifacts for the collection and books for the library, sponsors special programs at the museum, and provides funding for the "acoustiguide" self-guided tour system now in use. The goal of the foundation is to fund and build a large new museum and turn it over to NSA. [6]

With more space available, I began putting in new exhibits as well as expanding some of the original ones. We recalled the 5-ton US Navy cryptanalytic Bombe from the Smithsonian and added it to the popular Enigma exhibit. The Bombe—the last of 121 manufactured—had been used to solve Enigma keys during the Battle of the Atlantic and was a critical part of our cryptologic history. I had grown weary of telling our visitors they would have to go to the Smithsonian to see it, and it was now home where it belonged. [7]

In September 1997, an exhibit on aerial reconnaissance missions and losses was installed in conjunction with the opening of the National Vigilance Park, located within walking distance of the museum. [8]   We also created an exhibit on cryptologic support to the Vietnam War, using recently declassified information. And we added a mini-version of the NSA Headquarters, "They Served In Silence" memorial, which lists the names of 153 people lost in cryptologic service. By the end of the 1990s, the NCM staff had grown to six employees plus some 15 volunteers working as docents, librarians, and collection specialists. [9]   And we were again beginning to run out of space!

In one of his last ceremonial functions as director, Gen. Minihan presided over the opening of the Cryptologic Hall of Honor in March of 1999. Eight

cryptologic pioneers were inducted that first year, followed by three more in 2000, four in 2001, six in 2002, and four in 2003. Located in the museum lobby, the Hall of Honor pays public tribute to men and women who were, until their election to the Hall, unsung heroes of the cryptologic profession.

In the words of visitor Senator Daniel Patrick Moynihan, the NCM had become a "world-class museum." We had grown from one exhibit area to four separate spaces, and our annual visitation had increased from 10,000 people to over 40,000.

Planning of Exhibits

Typically, the museum staff works with the Center for Cryptologic History and the Office of Public and Media Affairs to develop a new exhibit that sounds interesting. Sometimes I receive specific requests from the director or other senior NSA officials. Once a new exhibit is decided upon, we research the subject, write the accompanying text, and select the photographs and artifacts to be used. Then I design the exhibit space and work with the NSA Graphics Section to fabricate and install it.

The range of exhibits remains impressive. A special book exhibit features *Polygraphia*, published in 1518, and other ancient texts on cryptology. An area devoted to the Civil War contains a rare Signal Honors Flag and a reproduction of an Underground Railroad quilt with secret message symbols used to communicate with escaping slaves. A section on World War I recreates an intercept site as used by the American Army along the Verdun Front. We have a large exhibit on World War II cipher machines and the machines that broke the enemy's codes. Our World War II area also highlights the Battle of Midway and the role of Native American Code Talkers in Europe and the Far East. We have artifacts from the Korean and Vietnam wars. On permanent loan to us from the Naval Research Laboratories is a reproduction of the first intelligence satellite, the GRAB I ELINT satellite launched in 1960. We have the replica of the Great Seal of the United States from the American ambassador's residence in Moscow that was discovered in 1952 to contain a KGB listening device. The museum also displays NSA's "RISSMAN" Telemetry Processing System, just taken out of service in 1995. Recently retired supercomputers and an

operating Storagetech data retrieval machine are also on display. And we completely redesigned an Information Assurance Gallery in August 2002, where the story of the development of secure codes and cipher systems is told.

Putting On A New Face

When Lt. Gen. Michael V. Hayden, USAF, became director of NSA in March 1999, he had a mandate from Congress to restructure the Agency and position it for the new millennium. With a graduate degree in history, Gen. Hayden visited the NCM early on. He not only appreciated the value of the museum for entertaining distinguished visitors and public outreach, but also saw it as an asset for improving NSA's message to the media. To this end, he placed the NCM under the Public and Media Affairs Office (PAO). Gen. Hayden and PAO chief Judith Emmel began to implement a strategy to put a more public face on the Agency and to engage with the media in an unprecedented manner. The NCM was to play a major part in this new initiative.

The NSA 50th Anniversary Exhibit,
which opened on 1 November 2002.

In April 2000, Gen. Hayden invited key reporters from *The Washington Post*, the *New York Times*, *The Baltimore Sun*, and other papers to the museum for an off-the-record news conference the night before he was to testify about NSA activities in open session before the House Permanent Select Committee on Intelligence (HPSCI). When the reporters arrived, I gave them a short tour of the Enigma exhibit. Then Gen. Hayden sat down with them in the conference room and laid out NSA's mission and how the Agency operates under the law with strong congressional oversight. He candidly answered their questions for over an hour. The next day, the reporters covered his appearance before HPSCI, where he presented much of the same material and answered questions from the committee members as he had the night before.

A new era in media relations and coverage of NSA had been launched. Gen. Hayden began inviting the news media to cover the unveiling of new exhibits at the museum, such as the opening of an exhibit on 18 September 2000 commemorating cryptologic support activities during the Korean War. The exhibit was the first event in NSA's public observance of the 50th anniversary of the Korean War. Representatives of the media have also been invited to the induction of new members into the NSA Hall of Honor, the opening of an exhibit on the African American experience at NSA, and a summer 2001 exhibit on US Coast Guard cryptanalytic activities during Prohibition. The PAO chief and Agency officials often use the museum conference room for interviews and meetings with writers and media representatives. These meetings often include a short tour of the museum. Maryland's US Senator, Barbara Mikulski, has even used the museum for a staff meeting and a session with her Veteran Affairs Advisory Board.

Television production crews have continued to use the NCM for background footage as well as sequences in new historical programs. In early 2001, the Discovery Channel interviewed staff members for a program about breaking the German Enigma cipher machine during World War II. The program aired internationally on television and the Internet.

With Gen. Hayden's many-faceted use of the NCM, it has continued to evolve into an important tool for improving the public's understanding and appreciation for NSA and its vital mission in the post-Cold War era.

The Museum Today

During 2002, the NCM was host to over 50,000 visitors, with staff and docents giving more than 1,200 tours. Dozens of primary, secondary, and university-level math, computer science, history, and language classes toured the exhibits. Active-duty military and veterans groups continue to visit in large numbers, as do Boy Scout and Girl Scout troops.

The museum is often referred to as "the front door to the Agency." As the only place where members of the cryptologic community can share something of the nature of their work with family and friends, the museum has proven to be a morale booster for employees. The NCM's outreach activities also support recruitment by giving prospective employees and new hires an understanding of and appreciation for the cryptologic profession. The Presidential Classroom and the National Youth Forum each visit twice annually, receiving tours designed to spark their interest in possible careers in cryptology.

The highlight over the past year was the opening of the major exhibit, "50 Years of Cryptologic Excellence," to celebrate the Agency's accomplishments during five decades of crisis and change throughout the world. The exhibit includes dozens of photographs, two showcases of unique NSA artifacts, and a continuous-play DVD titled "1952-2002: A Cryptologic Legacy."

The journey toward the National Cryptologic Museum, which began more than 50 years ago, has resulted in an institution that continues to evolve and improve every year. The NCM has been successful beyond anyone's expectations and I feel fortunate to have been involved in the creation and management of this truly "world-class museum."

Footnotes:

[1] Arthur Green and Douglas Parks proved to be masters of their trade, and the four of us made rapid progress in turning our ideas into reality.

[2] Joel Atwood was a gem. He had had many years of experience restoring

old trains and building model railroads. Joel stayed on as part of the NCM staff until his retirement in January 1994.

[3] A military equipment expert and good armchair historian, Larry Sharp, came on board in February 1994. John Hultstrand joined me as assistant curator in June and helped by taking on many of the public tours and other time-consuming functions of NCM operations.

[4] America lost one of its cryptologic giants when 90-year-old Frank Rowlett passed away in June of 1998.

[5] Maj. Gen. John E. Morrison, USAF Ret., came up with the idea of the foundation. Morrison is a former NSA deputy director for operations and the "founding father" of the National SIGINT [now Security] Operations Center.

[6] A museum gift shop operated by the NSA Civilian Welfare Fund using non-appropriated funds was opened in 1997. The shop, which offers NSA logo shirts, hats, coffee cups, pens, etc., as well as related books and posters, generates funds used to purchase items for the museum collections.

[7] When Jennifer Wilcox replaced John Hulstrand as assistant curator in April 1999, she made herself a true expert on the cryptanalytic Bombe, designing and upgrading the exhibit and writing a groundbreaking booklet explaining how the equipment worked.

[8] The park includes a refurbished C-130 replicating one shot down over Soviet Armenia in September 1958, and an Army RU-8 commemorating the Army's aerial reconnaissance activities during the Vietnam War.

[9] In 1999, the NCM was the beneficiary of an NSA program known as Soft Landing. As "Soft Landers," NSA careerists continued to work for 12 to 18 months after retirement for a contractor that assigned them to "new work." Andy Maxson and Stella Adams each worked at the museum for 18 months, developing educational and outreach programs and traveling exhibits. Also in 1999, the struggling museum library, which had had several librarians over the preceding years, gained a permanent and superb librarian in Rowena Clough.

Jack E. Ingram is curator of the National Cryptologic Museum at Fort

Meade, MD.