

# Restoration, Preservation, and Conservation of the 1905 Wright Flyer III

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**T**he 1905 Wright Flyer III at Carillon Historical Park in Dayton, Ohio, is one of the most significant aircraft in the history of aviation. This relatively unknown airplane is called the world's first practical airplane because, with this aircraft, the Wright brothers solved all the remaining problems of sustained and controlled flight. The 1905 Wright Flyer III is also the first plane ever to carry a passenger.

## **History**

Following their first flights at Kitty Hawk, North Carolina, in December 1903, Wilbur and Orville Wright returned home to Dayton for Christmas knowing that, while they had succeeded in their dream of flying, much work remained to make flying practical. The 1903 Wright Flyer flew four relatively short, straight-line flights before winds overturned it and damaged it beyond repair. Having succeeded in their dream of flying, the Wrights returned their base of operations to Ohio. Their work over the next two years would result in the Wright Flyer III.

The Wrights reported to the Aero Club of America in 1906, "From the beginning the prime object was to devise a machine of practical utility, rather than a useless and extravagant toy."<sup>1</sup> They succeeded with the Wright Flyer III. In the fall of 1905, this airplane made record-breaking flights over Huffman Prairie Flying Field outside Dayton, finally and irrevocably breaking the bonds of earth forever. This was the first airplane to consistently fly under the complete control of the pilot; take off and land without mishap; and stay aloft for as long as it had fuel. This graceful aircraft was the prototype for the Wrights' Model A airplanes which the brothers flew into international celebrity in 1908 and 1909.

In the mid-1940s, Orville Wright's personal friend, Col. Edward A. Deeds, chairman of The National Cash Register Company (NCR) in Dayton, conceived of the idea for a historical

museum village which he proceeded to build and endow. A major theme of the museum would be transportation: how it changed Dayton, and how Dayton changed transportation. Deeds' desire to include a Wright airplane in his museum led to the restoration of the 1905 Wright Flyer III.

Initially, Deeds expected to construct a replica of the 1903 "Kitty Hawk" Flyer. It was Orville Wright who felt that enough parts of the 1905 machine existed to do a restoration. Wright himself was in possession of the engine, propellers, and metal chain guides that the Wrights had brought back to their shop in Dayton. The frame had been left in a shed at Kitty Hawk following the plane's final flights in 1908. That May, the plane had been refitted from its original configuration with a pilot prone on the lower wing, to two upright seats for a pilot and passenger. The Wrights tested their ability to carry two men prior to Orville's flights for the United States Army Signal Corps whose contract required carrying a passenger.

Fortunately, Zenas Crane of Massachusetts, with Orville Wright's permission, had salvaged the 1905 airframe. The parts to the 1905 airplane would remain in the basement of the Berkshire Museum until the 1940s, waiting in vain for Wright to assist with a restoration.

## **Restoration**

Finally, with Deeds' new museum in mind, Orville Wright asked for the return of the 1905 airframe from Massachusetts. Other crucial pieces were obtained from former residents of the Kitty Hawk area who had broken into the Wrights' shed as boys in search of souvenirs. Carl Buest of NCR was put in charge of locating the now-grown gang of boys. He later wrote, "One had become a banker, another a minister. They were scattered all over the U. S.... The minister admitted that he was one of the boys who took souvenirs and that as a way of making it up he would help round up parts of the plane from all the boys. He did."<sup>2</sup>

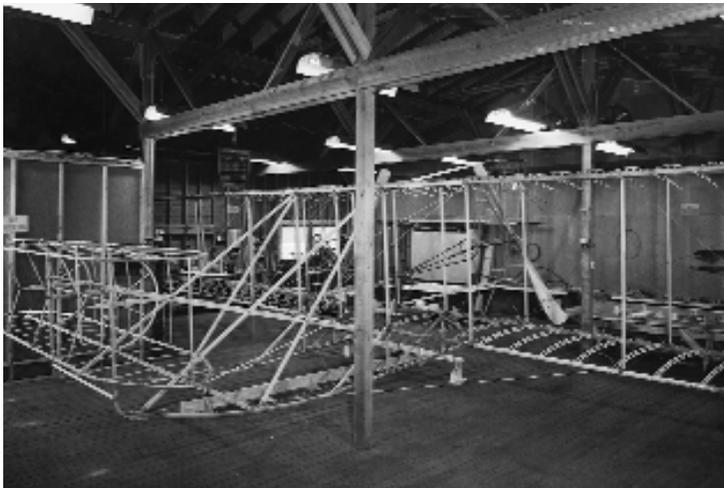
Orville supplied the 1905 engine, chain guides, and propellers. The engine was missing its original crankshaft and flywheel which had been used to replace those missing parts in the 1903 engine now in the National Air and Space Museum, Smithsonian Institution.

The pieces of the 1905 airplane were finally reunited in Dayton in a small wooden building called “the annex” on the factory campus of NCR where Deeds was now chairman of the board. The next problem to overcome was a lack of drawings. There were no systematic sets of drawings for the Wright Flyer III. Its design was evolutionary and numerous changes had occurred over the summer of 1905. Additionally, when the Wright brothers last flew the plane in 1908, they had replaced the hip cradle with two seats for a pilot and passenger.

Deeds hired Louis P. Christman, an NCR draftsman, to make new drawings for the Wright Flyer III. Christman’s complete set of drawings is preserved today at the Smithsonian Institution. Harvey P. Geyer, a talented member of the Wrights’ staff from the early years of The Wright Company, was hired as project director. Orville Wright would regularly meet for lunch with Deeds at NCR as the project advanced. Replacement parts were painstakingly fashioned and new “Pride of the West” muslin fabric was obtained to cover the frame. The photography department of NCR documented the restoration on at least three separate dates—December 22, 1947, September 7, 1948, and December 1, 1948.

Meanwhile, Orville Wright also collaborated on the design of Wright Hall, the building at Carillon Historical Park which enshrines the Wright Flyer III. The building is a simple one-story plan. Its most interesting feature is the sunken space in which the airplane is set. Similar

*Restoration of the Wright Flyer III, December 1, 1948. Courtesy Carillon Historical Park.*



to the experience the visitor gets at Les Invalides, Napoleon’s tomb in Paris, France, the visitor to Wright Hall looks down at the airplane from an encircling walkway. The story is that Orville felt this was the best way to view the airplane in order to understand how it operated.

The restoration of the airplane was well underway when Orville Wright died in 1948. Work on Wright Hall was completed and the airplane was moved the short distance from NCR to Carillon Historical Park. When asked about the restoration’s authenticity, Harvey Geyer is quoted as saying that he could fly it across the street to Wright Hall. The airplane is estimated to be about 80% original. The airplane was the centerpiece of Carillon Historical Park’s grand opening to the public on June 3, 1950. And there it has remained for nearly 50 years.

### **Preservation**

For its first 35 years at the park, the airplane benefited from Carillon Historical Park’s quiet low key existence. The park was practically unknown outside the region, and was open to the public only seasonally. Moreover, visitors of this era had to be personally guided from building to building, and so the airplane sat in darkness much of the time. The pit area had been painted a swimming pool green, and the walls, tile, and floors were a medium green as well. These factors kept the light levels low. Also, the building’s heating system was kept at a low temperature throughout the winter months, which helped to keep the plane’s wooden framework from drying out.

With the beginning of on-site, full time administration in the mid-1980s, Carillon Historical Park awoke from a long slumber. Fortunately, the park was also beginning to receive professional conservation advice. In 1984, Robert B. Adair, objects conservator at the U.S. Air Force Museum, completed a conservation assessment of the 1905 Wright Flyer III. He noted most of the same problems that we still face today: generally good condition with some rusting of the wires and some “foxing” or mold growth on the fabric. Adair also noted that any conservation treatment of the airplane would be futile until the environmental issues in Wright Hall were addressed and corrected.

In 1988, I was hired as Carillon Historical Park’s first curator, and in 1991 the Wright Flyer III was named a national historic landmark. That same year we began to focus on conservation of the park’s collections. The park applied for and

received a conservation assessment, or CAP, grant from the Institute for Museum Services (IMS). This assessment was invaluable for addressing conservation issues in the park's long range planning. The reports that ensued from this grant gave us the tools we needed to systematically plan improvements. As noted in our earlier assessment, improvements to the environmental conditions were seen as the most important first step in our conservation plan.

Following the recommendations outlined in the CAP report, at Wright Hall, vegetation was removed from around the building, gutters and downspouts were checked more frequently, foundation cracks were caulked, and roof slates replaced. In 1992, a new roof on the rear half of the building was installed to eliminate leaking. To facilitate improved custodial care, a dedicated backpack vacuum cleaner was purchased to make dusting the airplane safer.

Hygrothermograph recordings were kept which showed that despite a lack of air conditioning, temperature variations inside the building were not extreme. Humidity fluctuations, however, were a problem, particularly in the humid Ohio summers. Portable dehumidifiers were installed to help with the high humidity, but a lack of water in the building made humidifying the winter air impossible. Problems with insect infiltration and moisture were noted.

In October 1992, Dayton Aviation Heritage National Historical Park was established with Wright Hall and the Wright Flyer III as privately owned and managed partnership sites. With the centennial of the Wright brothers' first flight 11 years away, planning began in earnest for Carillon Historical Park, and especially Wright Hall and the Wright Flyer III, to be ready.

In 1994, the park made major improvements to the building. A local architect designed a protective shelter made of PVC pipe, three-ply cardboard, and plastic sheeting in which the air-

plane was temporarily encased. Water lines were run to the building and a dry line fire suppression system was installed. New electrical wiring, track lighting, and ceiling insulation were added. The interior was repainted a light color, and UV protective film was applied to the windows.

With funding from The 2003 Committee and the state of Ohio, work began on the Wilbur Wright Wing that connects Wright Hall with the replica Wright Cycle Shop; the wing opened in 1997. The HVAC system installed in this wing was designed to carry half of the air-conditioning load for Wright Hall. The new wing also made Wright Hall handicapped accessible.

A capital fund-raising campaign began with a major goal of raising the necessary funds to build the matching Orville Wright Wing on the west side of Wright Hall. The two new wings would provide much needed space for interpretation and act as a buffer for the environment within Wright Hall itself. The hall could return to its original function as a shrine for the airplane, and Wright artifacts that, over the years, had been added to the room could help interpret the Wright story in the adjacent wings. The Orville Wright Wing will complete the John W. Berry, Sr. Wright Brothers Aviation Center, providing HVAC controls to Wright Hall, closing off the main door, and isolating the Wright Flyer III from direct contact with outside air.

Carillon Historical Park's affiliation with the National Park Service has greatly benefited the present and future condition of the Wright Flyer III. The park's small staff has been able to tap the resources and expertise of interpreters and conservators within the National Park Service. In March 1999, Carillon Historical Park engaged a conservation team to conduct a condition assessment of the airplane. This report contains an extensive condition assessment of the Wright Flyer III and conservation recommendations for implementation. As the results of the recent conservation assessment have become known, an improved HVAC has been planned. As interpretive planning for the center goes forward, the needs of the Flyer will strongly influence the lighting design as well.

The park's fund-raising campaign and the conservation assessment came at a most opportune time. The Save America's Treasures grant program, announced in January 1999, is a White House Millennium Council initiative to protect the nation's most significant artifacts as part of the National Millennium Commemoration. It is part-

*Wright Hall at Carillon Historical Park. Courtesy of Carillon Historical Park.*



nering with the National Trust for Historic Preservation to celebrate and preserve our nation's irreplaceable historic and cultural legacy. Applicants had to demonstrate the national significance of their project and assure a match for any requested funds. Carillon Historical Park submitted an application for conservation of the 1905 Wright Flyer III, and our efforts were rewarded on May 19, 1999, with the announcement that our project was one of four projects funded through the Institute of Museum and Library Services.

As Wright Hall evolves into the new Wright Aviation Center, we will refine an interpretive plan and complete a conservation treatment plan

for the restored 1905 Wright Flyer III. We are supported with the professional advice we receive through our affiliation with Dayton Aviation Heritage National Historical Park. This unusual form of private/public partnership benefits not only the taxpayer and the partnership sites, but also the irreplaceable national historic landmark, the 1905 Wright Flyer III.

#### Notes

<sup>1</sup> *NCR World* (September–October 1970): 16.

<sup>2</sup> *NCR World* (September–October 1970): 18.

*Jeanne Palermo is Director of Curatorial Services at Carillon Historical Park.*

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John Donnelly

## Flying Off Rooftops

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**N**estled in the center of 366 historic acres of the Vancouver National Historic Reserve lies peaceful little Pearson Field; a general aviation field located in the heart of downtown Vancouver, Washington.

For a small general aviation field, Pearson has a lot of ties to both national and international aviation milestones. It is one of the oldest continuously operating airfields in the entire country as its aviation history dates back to a dirigible flight by Lincoln Beachey in 1905. This flight was the first aerial crossing of the Columbia River and the first aerial landing at Pearson.

Fixed wing flying began at Pearson in 1911 when Charles Walsh was the first pilot to build a Curtiss Pusher and fly from Pearson Field on June 15, 1911. The following year, Silas Christofferson became the second aviator to fly from Pearson when he piloted a Curtiss type biplane and made two flights on May 12, 1912. Silas logged over 200 flights at Pearson Field in 1912, but his most famous flight occurred on June 11 in front of a crowd of Portland, Oregon, Rose Festival celebrants estimated at 50,000.

The reason for the large crowd was that Silas was going to attempt the first flight off of a rooftop of a hotel in downtown Portland. In preparation for his flight from the Multnomah Hotel, Christofferson flew the Curtiss biplane to the Waverly Golf Links along the Willamette River just south of Portland where it was dismantled. The plane was then transported to the hotel

where it was hoisted to the roof and reassembled on top of a wooden ramp that was constructed on the hotel rooftop. Christofferson sped down the 170-foot ramp and leaped into the air. He climbed to an altitude of 900 feet while he flew over the Willamette and Columbia Rivers on his way to Vancouver. This was the first crossing of the Columbia River by an airplane.

It was a drizzly day and Silas got lost in the haze. He finally found a moving point of reference to orient himself. "Looking down I saw an object on the water; it did not look more than a foot long, and there was black smoke coming out. That must be the ferry boat from Vancouver to Hayden Island, I thought, and then I knew where I was."

After a 12-minute flight, he landed at the Vancouver Army Barracks at what had been nicknamed "Aviator's Field." Eighty-three years later, Pearson Air Museum re-enacted that historic flight with a Curtiss Pusher replica that was built in 1946. Gaining permission from both the Federal Aviation Administration and the City of Portland, a 200-foot ramp was built on top of the Multnomah Hotel.

Tom Murphy from Hood River, Oregon, was the brave pilot who flew the replica off of the rooftop and traveled to Pearson Field where he landed safely some 26 minutes later. Tom experienced the same drizzly weather for a much longer flight, as he had to avoid the airways of the Portland International Airport. The replica Curtiss Pusher can still be seen in the Pearson Air Museum in Vancouver, Washington.

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*John Donnelly is the Executive Director of the Pearson Air Museum.*