

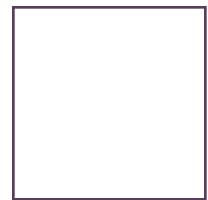
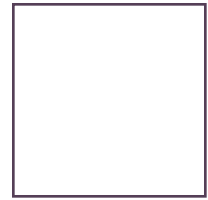


Photo  
Essay  
Collection

**A History of  
the Rockcliffe  
Airport Site:  
Home of the  
National Aviation  
Museum,  
Ottawa, Canada**

By Stephen R. Payne  
*Curator,  
Aeronautical Technology,  
National Aviation Museum*

© National Aviation Museum 1999



National Aviation  
Museum

Musée national  
de l'aviation

Canada



## Photo Essay Collection



### Table of Contents

Introduction . . . . .	1
Pre-military History, 1804–1898 . . . . .	2
The Militia Era . . . . .	3
Ottawa Air Station: The Formative Years, 1920–1928 . . . . .	6
The 1930s at Rockcliffe . . . . .	11
Rockcliffe: The Centre for Aeronautical Testing . . . . .	19
The War Years . . . . .	22
The “Rockcliffe Ice Wagon” . . . . .	28
Rockcliffe: The Centre for Aerial Survey in Canada . . . . .	29
Changing Times . . . . .	36

## Introduction

RCAF Station Rockcliffe, one of the more picturesque of Canada's former military bases, developed into the country's showcase air station after its creation in 1920. When the air force ceased active military flying from Rockcliffe's airfield in 1964, the site's proud aviation legacy was acknowledged with the housing of Canada's national aeronautical collection there during the mid 1960s. An amalgamation of the historic aircraft collections of the Canadian War Museum, the early National Aviation Museum and the Royal Canadian Air Force (RCAF), Canada's national collection was housed for the next 24 years in three military hangars built during the Second World War.

The former Rockcliffe Air Station site encompassed 376 hectares [930 acres], located approximately 6 km northeast of Canada's Parliament Buildings, along the Ottawa River. It was a split-level station with its two levels separated by a 15-m cliff. On the upper level were 600 married quarters, messes and institutes, headquarters, and recreational facilities. From this upper level was a panoramic view of the airfield below, with its runways criss-crossing down to the Ottawa River, the Gatineau Hills gently rising in the distance. On the lower level of the flying field was a row of hangars nestled at the foot of the cliff. On the river side of the field were two former seaplane hangars, a slipway and a Royal Canadian Mounted Police (RCMP) hangar at its western extremity.

In 1988 the collection moved into a new home when the National Aviation Museum relocated to a facility built in the centre of the former airfield. Housing one of the world's more significant historic aircraft collections, the Museum's location is in keeping with the site's distinguished aeronautical heritage. An examination of Rockcliffe's history reveals the evolution of this legacy, shaped by several well-defined and interesting eras.

## Pre-military History, 1804–1898

The earliest recorded owner of the section above the cliffs was Richard Wragg, who obtained 80 hectares [200 acres] under the system of land grants made to United Empire Loyalists. These colonists had supported the unity of the British Empire during the American Revolution and later emigrated to Upper Canada from the United States.

*The Upper Canada Land Book* describes Wragg as a resident of Montreal and, although the land continued to be registered in his name until 1844, there is no indication that he lived on it. By 1852, the name of Jean Bareille had appeared in the census book as the earliest farmer in the district. Bareille, then aged 48, his wife and four children are recorded as living in a stone house on lot 23, consisting of 80 hectares [200 acres]. This house differed markedly in style from other houses in the area and resembled the old farm houses of northern France. The fine stone structure attested to the permanence he must have felt for the area. However, he moved on to more profitable investments in the nearby city and there now followed a series of owners, who appeared to be land speculators as there is no proof that any of them lived on the land.



*Jean Bareille's original stone farmhouse, built around 1850, shown in 1929 as the Royal Canadian Air Force Officers' Mess, Rockcliffe. (Public Archives of Canada PA 62631)*

In 1868, John A. Snow registered a mortgage on a 57-hectare [140-acre] portion of the property. Snow was a surveyor who came to Canada from Boston and owned property in the Ottawa area. After his death in 1888 the property passed to his sons. Because there were so many mortgage holders over the years, it appears the land was not used for any purpose other than light farming until Charles H. Snow (1862–1931) inherited the property. The farm then saw its greatest agricultural development as Snow, for many years a pomologist and Chief Inspector of Fruit and Vegetables for the Department of Agriculture, planted apple orchards and constructed out-buildings for the fruit harvest. It was named the Island View Fruit and Berry Farm because, from its vantage on the property's rocky cliffs, it looked out over the Ottawa River onto Kettle Island (a direct translation of the original Indian name Asticou, meaning kettle).

## The Militia Era



*The 43rd Duke of Cornwall's Own Rifles relax in front of their clubhouse at the Rockcliffe Rifle Range, ca 1900. (City of Ottawa Archives CA-18601)*



*The first known interest in the Rockcliffe site by the military was in 1898 when the Canadian government expropriated the low-lying area along the riverbank and established the Rockcliffe Rifle Range for the training of militia riflemen away from the populated area of the city, ca 1902. (Public Archives of Canada PA 16483)*

The military first showed interest in the site in 1895 when the Dominion Government surveyed the lower sections of the site. In the late 1890s the Department of Militia and Defence was in desperate need of a new rifle range in the Ottawa area as the existing ranges had become dangerous and expensive to operate. The department began expropriating the low-lying area of land along the Ottawa River as the military potential of its open fields and woodlands was obvious. In 1898, the peaceful setting was disturbed by the popping of gunshots after the Dominion Government established the Rockcliffe Rifle Range to train militiamen. By the turn of the century the area was firmly associated with guns and horses. The name Rockcliffe was borrowed from the adjoining Rockcliffe Village, named after a retired British Army officer who had resided there for some time. The choice of this name may have also been influenced by the fact that the upper and lower levels of the site are broken by rocky cliffs.

The limestone cliffs served the site as natural gun butts. In addition to the 160 hectares [400 acres] it had already expropriated, in 1905 the Department of Militia and Defence considered the acquisition of the Snow property after a few “near misses” raised the possibility that an injunction would close the range. Living on the heights above this low-lying area, the Snow family decided to sell their farm, a decision hastened by their reaction to the stray bullets from the raw recruits handling rifles. Interviewed in their senior years by an Ottawa journalist in 1960, family members reported that, after a near miss while hanging out her wash, Mrs. Snow felt it was imperative they move from their farm. Purchasing land a little further east (now part of the National Research Council's (NRC) Montreal Road establishment), they planted orchards. Some venerable apple trees are still in evidence near the back gates leading into the NRC's campus.

The Dominion of Canada Rifle Association was the first group to move to the range site. From its founding in 1868, it was considered an institution of national military importance, as it provided rifle training for many Canadian militia soldiers. During the range's first decade, the Department of Militia invested much time and money to improve the facility with buildings for lecturing and water, sewage, electricity, and telephone services. The most celebrated use of the site during this early period was when it served as the home of the Militia's School of Musketry.

Members of the Duke of Cornwall's Own Rifles trained regularly at Rockcliffe, where they had a clubhouse. The unit participated with a Canadian rifle team, which, in 1901, won the Palma Trophy for shooting in competition with an American team. It was the first time the trophy left the United States.



*Stereoscopic photo of a shoot at Rockcliffe Rifle Range, probably organized by the Dominion of Canada Rifle Association, ca 1903. (Public Archives of Canada PA 107497)*



*The Canadian rifle team competing for the Palma Trophy, Rockcliffe Rifle Range, September 14, 1912. (Public Archives of Canada PA 108063)*

In its early years, the site was considered to be a good rifle range, although the area's poor drainage was a concern to the military units who used it for their military manoeuvres. When first acquired, this low-lying area was covered with a swampy forest of cedars and silver maple. Later, it was considered unsatisfactory as a training site, although military training continued on the site throughout the First World War. During the war, units were inspected at the Rockcliffe camp, including the 1st Motor Machine Gun Brigade. After the war, the grounds were used less frequently by the Army. Veterans were housed there temporarily upon their return to Canada, and units continued to use the ranges for a few years until the new Connaught Rifle Ranges west of Ottawa opened.



*The 1st Motor Machine Gun Brigade vehicles being prepared for Governor General's inspection, Rockcliffe Rifle Range, September 1914. (Public Archives of Canada C-11267)*



*The Duke of Connaught and the 1st Motor Machine Gun Brigade, Rockcliffe, 1915. (Public Archives of Canada PA 99756)*

Other developmental pressures on the Rockcliffe site now occurred. By 1918, the Royal Air Force (RAF) was conducting experimental mail flights, using the area behind the rifle range butts as a landing ground. Four round trips were flown by their training organization using Curtiss JN-4 Canuck aircraft in August and September of that year. These flights were the first in a long and proud history of aviation activity at Rockcliffe.

Following the First World War, a government air station was established on the site by the Air Board and, in 1922, the area was turned over to the military for the new Ottawa Air Station. The old farm house, built by Jean Bareille in the 1850s on the upper level and now nearly 75 years old, became the Officers' Mess; its second story bedrooms were used as officers' quarters when the Royal Canadian Air Force was established in 1924.



*The first aviation activity at Rockcliffe occurred during the first experimental airmail flights between Toronto and Ottawa on August 27, 1918. Standing beside the Curtiss JN-4(Can) aircraft, third from the right, is William Lyon Mackenzie King, future Prime Minister of Canada. (Public Archives of Canada PA 59985)*

## Ottawa Air Station: The Formative Years, 1920–1928



*Taken in June 1921, looking southwest, this is the earliest known photograph of Rockcliffe's aerodrome. Established by the Air Board as Ottawa Air Station, a small dock had been installed behind the hangar and a Curtiss HS-2L flying boat was tied up there. The small triangle in the centre of the runways was a code mark indicating a commercial air harbour. (Public Archives of Canada PA 62456)*



*The first hangar at Rockcliffe, photographed in 1921. This is one of the canvas-covered Bessonneau hangars donated by Britain to Canada in 1920. A Bristol F.2B fighter is in the doorway. (Public Archives of Canada RE 18027)*

The rapid advances in aviation technology, driven by the stimulus of the First World War, dictated the need for an air station in the vicinity of Canada's capital city for governmental air operations. In 1919, Great Britain signed the Peace Convention in Paris, committing Canada to the International Convention for Air Navigation. This Convention required Canada to control air navigation within its borders and the Air Board was created by an Act of Parliament in 1919 as a regulatory body. Air Regulations under the Act came into force in January 1920 and the Air Board selected Rockcliffe as the most suitable site for an aerodrome within a radius of 24 km of Ottawa, one that could accommodate both an air harbour and a flying field. The aerodrome, known at first as Ottawa Air Station, opened in the fall of 1920 and its major activities for the next 40 years included military aerial photography for the mapping of Canada, air transportation and aeronautical experimentation. The station was one of six original airfields opened by the Air Board in various locations across Canada in 1920.

The early flying field consisted of nearly 185 hectares [455 acres] stretching along the Ottawa River and included the danger area of the Rifle Range, a factor which did not apparently affect the work of the pilots. The adjacent river provided perfect facilities for the use of seaplanes, and, until RCAF Station Trenton became operational a decade later, Rockcliffe was the only combined landplane and seaplane base in Canada. At the beginning, the only building on the airfield was a portable canvas Bessonneau hangar of war vintage, erected by the Air Board in 1920 on the north side of the field for maintenance work.

After the British government offered a gift of up to 100 war-surplus aircraft to each of the dominions, the Canadian government accepted and instructed the Air Board to use them on civil operations. It was decided that experiments should be conducted to determine whether or not aerial photographs could be used for survey purposes and Ottawa was selected as the site for the first trials. The first flight took place over the city in 1920 and, in 1921, another survey employing both vertical and oblique photography was conducted along the St. Lawrence Seaway using a Curtiss HS-2L flying boat and a de Havilland DH-4 aircraft. In 1922, the testing and development of wireless telephony, which up to then was hampered by engine noise, was carried out and the experiment was a success. Crop dusting methods were also tested for the Department of Agriculture at this time. By 1922, Ottawa Air Station had a staff of 18, including officers, airmen and civilians.





*Bristol F.2B operated by the Air Board at Rockcliffe for aerial photography, 1920. (Public Archives of Canada RE 13840)*



*Air personnel in Avro 504K during photographic duties, 1920. (Public Archives of Canada PA 117849)*



*Avro 504K aircraft G-CYAX operated by the Air Board at Ottawa Air Station dock in 1921. (Public Archives of Canada PA 62259)*



*Personnel of the Canadian Air Board, Rockcliffe, 1921. (Public Archives of Canada PA 117846)*



*Engine fitter servicing a de Havilland DH-4B of the Canadian Air Board, Rockcliffe, 1921. (Public Archives of Canada PA 117850)*



*Aircrew with de Havilland DH-4, Rockcliffe, 1921. (Public Archives of Canada PA 117841)*



*The primitive conditions of Rockcliffe's early years is evident in this photograph of the engine test bed at Ottawa Air Station in 1922. (Public Archives of Canada PA 62290)*



*Interior view of the wooden hangar and hull of Curtiss HS-2L flying boat, Rockcliffe, 1922. (Public Archives of Canada PA 62292)*



*The Bessonneau hangar at Rockcliffe showing a Bristol F.2B in the doorway, with a de Havilland DH-4 and an Avro 504K lined up outside, ca 1922. (Public Archives of Canada PA 62272)*

During a brief period following the First World War, from 1919 to 1922, the Air Board functioned as a civilian branch of the government, except for one of its components, the Canadian Air Force, which retained a small semi-permanent service staff. During 1922 the civilian components were gradually consolidated into the air force, which in 1923 became part of the new Department of National Defence. At this time, the city of Ottawa was photographed from the air and a mosaic map was completed, the first aerial photography conducted by the air force. Two war-surplus aircraft, an Avro 504K and a Bristol F.2B fighter, were used with a wartime camera bolted to the sides of the machines. (In 1924, Canada's military air service became the Royal Canadian Air Force.)

Slowly, Rockcliffe began to develop as an air station. Eventually, its association with the RCAF would be the second longest of any station in Canada. Early on it was apparent that the original canvas hangar would not stand up well to the Canadian climate and by 1923 its canvas covering had been replaced with wood, although the original frame still retained its characteristic shape.



*An Air Board de Havilland DH-4 aircraft preparing for an airmail flight to Toronto in 1923. By 1922 the canvas covering of the original hangar had been replaced with wood because of deterioration caused by the Canadian climate. (Public Archives of Canada PA 62293)*



*Air Vice-Marshal Earl Godfrey (1890–1982), prior to his retirement from the RCAF in 1944. A pilot in the Royal Flying Corps during the First World War, he served briefly as Rockcliffe's first Commanding Officer in 1922 and again during the 1930s. (National Aviation Museum 11867)*



*An Air Board Curtiss HS-2L at the top of the primitive slipway at Rockcliffe in 1922. In 1925, the Ottawa Air Station was moved 24 km up the Ottawa River to Shirley's Bay because the high river banks at Rockcliffe made the beaching of seaplanes and flying boats a major problem. (Department of National Defence RE 18032)*

Rockcliffe's first Commanding Officer was Squadron Leader Earl Godfrey, who would eventually reach the rank of Air Vice-Marshal. Following ground action in France during the First World War, he joined the Royal Flying Corps in 1916. After a period as an air observer, he trained as a pilot and was eventually credited with shooting down 17 enemy aircraft. Returning to Canada as Chief Instructor of the Aerial Gunnery School at Beamsville, Ontario, Godfrey then became Commanding Officer of that station, the last to be built in Canada during the war. Rejoining the air force after the war, he commanded the new station at Rockcliffe in 1922 before taking over RCAF Station Camp Borden near Barrie, Ontario, later that year. Godfrey came to public attention in 1926 when he and James Dalzell McKee, for whom Canada's premier aeronautical award was named, made the first trans-Canada flight employing a single aircraft, a Douglas O-2Bs seaplane.

During these early years of aviation, the 185-hectare [455-acre] site went through many changes. In 1924 the property was used as a storehouse for technical and military supplies related to aviation. Since its earliest days, seaplanes and flying boats had been operated from the station, which had been designated by the Air Board as an "air harbour." In 1925, there was a brief hiatus as operations were temporarily moved 24 km up the Ottawa River to Shirley's Bay. This move was necessary because the high river banks at Rockcliffe made the beaching of seaplanes a major problem.

Difficulties accommodating seaplanes at Shirley's Bay, among other considerations, led to the decision to return to Rockcliffe in 1928. In 1927, in preparation for this return, the butts of the Rockcliffe rifle range were removed and the ground levelled. Additional land was acquired for the aerodrome and, in 1928, a new hangar was built, dwarfing the old hangar beside it. A permanent slipway was built into the Ottawa River, which remains to this day, and the station was then re-opened as both a landplane and a seaplane base.



*A Curtiss HS-2L flying boat being eased down the banks of the Ottawa River in 1922. Later, a permanent slipway was built and Rockcliffe was re-opened as both a landplane and seaplane base in 1928. (Department of National Defence RE 18034)*



*Spring conditions on approach to the original hangar, 1929. (Public Archives of Canada PA 62627)*

At the time, the evolving use of the site probably led to a certain amount of confusion among those involved. However, despite the growing pains, the land was developed considerably during the decade. The years 1920 to 1928 could be called the formative years when the building of the base began in earnest and sections of land took on specific purposes. The number of buildings went from one portable hangar to several hundred buildings, all constructed with the purpose of serving the military in some way.



*In this aerial photo of Rockcliffe taken around 1930, the new slipway and hangar built in 1928 are prominent while the old hangar is dwarfed beside it. (Department of National Defence RE 68-907)*



*A lineup of period civilian and RCAF aircraft parked in front of the old hangar at Rockcliffe, ca 1930. (Public Archives of Canada PA 62578)*

## The 1930s at Rockcliffe

Until well into the 1930s, government air operations were controlled by the air force. It would not be inaccurate to refer to the RCAF pilots of the time, who flew float-equipped aircraft into Canada's hinterland, as "bush pilots in uniform."



*Vickers Vancouver I flying boat G-CYXS of the RCAF at Rockcliffe in 1929. (Public Archives of Canada PA 62570)*



*Arrival of a Fairchild 71B aircraft on completion of a 1900-km flight along water and air routes in the Northwest Territories, October 1930. (Public Archives of Canada PA 62587)*



*A 28 Canadian Vickers Vigil aircraft of the RCAF on a scow in the Ottawa River. A "beaching gear" lies on the dock. (Public Archives of Canada PA 62576)*



*A lineup of Vickers Vedette flying boats on their beaching gears during the late 1920s. Besides aerial photography, Vedettes were used by the RCAF for forestry patrol and training. (Department of National Defence RE 11710-80)*



*A Fairchild FC-2 and Fairchild 71 on the slipway. The latter is leaving on an Indian Treaty money payment flight in June 1929. (Public Archives of Canada PA 62611)*



*Warming the engine on a Fairchild FC-2 with torch and canvas engine cover in March 1929. (Public Archives of Canada PA 62629)*



*One method of communication used between aircraft and their base at Rockcliffe in the late 1920s and early 1930s was carrier pigeon. (Public Archives of Canada PA 62837)*



*Col. William G. Barker, VC, of Dauphin, Manitoba, in his service Wing Commander uniform. (National Aviation Museum 3527)*

Throughout the years from 1929 to the beginning of the Second World War, military flying at Rockcliffe consisted mainly of photographic survey work for the Dominion Government, transportation of personnel, and testing and development of the few new aircraft ordered for the air force during the lean, depression years.

The occasional famous visitor stopped at Rockcliffe during this time and attracted the attention of the newspapers, although one story ended in tragedy. On the afternoon of March 12, 1930, Canada lost one of its more remarkable wartime fighter pilots when Wing Commander William G. Barker, VC, crashed onto the frozen surface of the Ottawa River, adjacent to the airfield. He apparently lost control of his Fairchild KR-21 aircraft and crashed in front of assembled air force officials during a flight demonstration. At the time he was Sales Manager of Fairchild Aircraft Ltd of Montreal.



*William Barker beside his Sopwith Camel in Italy during the First World War. (National Aviation Museum 3522)*



Canada lost one of its leading fighter pilots when the Fairchild KR-21 that Barker was demonstrating crashed onto the Ottawa River near the slipway at Rockcliffe on March 12, 1930, killing him instantly. (Department of National Defence RE-74-166)



William Barker, VC, (right) and Billy Bishop, VC, (left). After the war the famous airmen became business partners and founded a short-lived company that flew sportsmen and tourists into northern Ontario. (National Aviation Museum 8069)

In the following years, other world famous aviation personalities visited Rockcliffe with their aircraft. In July 1931, four years after his epic solo flight across the Atlantic in the *Spirit of St. Louis*, Colonel and Mrs. Charles Lindbergh landed on the Ottawa River and docked their Lockheed Sirius aircraft at Rockcliffe's slipway. On this occasion, their northern survey flight ended in China and Mrs. Lindbergh subsequently wrote a book about their adventure entitled *North to the Orient*.



Lindbergh had previously visited Ottawa in July 1927 with the Spirit of St. Louis shortly after his epic solo flight across the Atlantic from New York to Paris. (National Aviation Museum 8343)



Among the famous airmen and airwomen to visit Rockcliffe were Col. and Mrs. Charles Lindbergh, shown here in 1931 in front of their Lockheed Sirius, built to suit Lindbergh's requirements. (National Aviation Museum 5374)



Anne Morrow Lindbergh at Rockcliffe, August 1931. (National Aviation Museum 7262)



Col. Charles A. Lindbergh conferring with RCAF officers, Rockcliffe, August 1931. (National Aviation Museum 7260)



Mrs. Lindbergh preparing to leave Ottawa for the Orient, via the Canadian Arctic. (National Aviation Museum 8434)



After an overnight stop in Ottawa, the Lindberghs prepare to cast off in their Lockheed Sirius on August 1, 1931, to continue their survey flight north to the Orient. (National Aviation Museum 7252)



Lindbergh's Lockheed Sirius taxis out for takeoff, Rockcliffe, 1931. (National Aviation Museum 2614)



Lindberghs leaving Ottawa, August 1, 1931. (National Aviation Museum 8432)

Noted American speed- and distance-record flyers Frank Hawks and Jimmy Wedell both attempted new records with flights starting from Rockcliffe. Already famous for record flights in his own country, Hawks flew a fast, specially built racing monoplane manufactured by the Travel Air Company of Wichita, Kansas. Reflecting his sponsorship, his machine was named the *Texaco 13* and was popularly referred to as the *Travel Air Mystery S*. He set speed records between Ottawa, Montreal and Toronto during a single day at over 290 km per hour, a good speed for those days. His run from Ottawa to Montreal took 48 minutes.





*In July 1931 Frank Hawks flew his Travel Air Texaco 13 from Rockcliffe, establishing speed records between several Canadian cities. (Public Archives of Canada PA 62890)*



*Famous American race pilot and aircraft designer Jimmy Wedell established an Ottawa-to-Mexico speed record in 1932 when he flew his Wedell-Williams "44" racer from Rockcliffe. His aircraft is shown in front of the recently-built north hangar. (Public Archives of Canada PA 63014)*



*Pilots of "The Siskins," the RCAF's first aerobatic team, at Rockcliffe in 1929. Few activities of the early RCAF impressed the public more than the flying displays put on by the small formation of Siskin fighters. (Public Archives of Canada PA 62612)*



*Lineup of Armstrong Whitworth Siskins at Rockcliffe during the 1930s. (National Aviation Museum 10968)*

This was the era when international speed and distance flights caught the public's attention. Major Jimmy Doolittle of the U.S. Army had established a new record from Ottawa to Mexico City in 1931. This flight was dubbed "The Three Flag-Three Capital Flight." A year later, famous racing pilot Jimmy Wedell, taking off from Rockcliffe, bettered Doolittle's time when he hopped from Ottawa to Washington. After a short stay, he landed at Mexico City, eleven hours and 53 minutes after leaving Ottawa. Thus began the interest in the so-called "Three Flag Flights" from other locations in Canada to Mexico. Both Wedell and Hawks eventually lost their lives in air accidents in 1934 and 1938 respectively.

The RCAF's first aerobatic display team made appearances at Rockcliffe during the 1930s. Flying Armstrong Whitworth Siskin biplanes, and known as "The Siskins," they performed for the crowds during the first Air Force display held at the Station on July 14, 1934. Air Force Day celebrations, highlighted by aerobatic performances and static displays, became an annual tradition at Rockcliffe during the 1950s and early 1960s.



Armstrong Whitworth Siskin III. The small force of Siskins were Canada's only front-line fighters right up to the eve of the Second World War. (National Aviation Museum 4395)



Siskin III being run up at Rockcliffe, ca 1930. (National Aviation Museum 5243)



Siskin III in flying attitude as the aircraft is rigged after overhaul in 1931 by Ottawa Car Manufacturing, Ottawa. Siskins were used for the aerobatic flying that was an integral part of RCAF pilot training. (Public Archives of Canada PA 62726)



An overview of Rockcliffe during the air display on July 14, 1934. (Public Archives of Canada PA 134310)



Officers of RAF No. 1 Squadron on arrival with their Hawker Furies at Rockcliffe, June 1934. Greeting them is the Commanding Officer of RCAF Station Ottawa, Wing Commander Earl Godfrey. (Public Archives of Canada PA 62965)



Siskin formation, Air Force Day, Rockcliffe, July 1934. (Public Archives of Canada PA 63145)

Another visit of note was that of the Short "Empire Class" flying boat, *Cambria*, of Imperial Airways in 1937. Imperial Airways and Pan American Airways had both inaugurated experimental transatlantic service flights that year, foreshadowing a passenger service that was to become commonplace after the Second World War.



*RAF Hawker Fury formation in flight for the crowds, Air Force Day, Rockcliffe, July 1934. (Public Archives of Canada PA 63141)*



*Royal Air Force officers of No. 1 Squadron with mounted policeman, Air Force Day, Rockcliffe, July 1934. (Public Archives of Canada PA 63284)*



*Armstrong Whitworth Atlas I aircraft of the RCAF picking up messages during Air Force Day, July 1934. The Atlas complemented the Siskins in Canada's small air force of the 1930s and remained in front-line duty until the early months of the Second World War. (Public Archives of Canada PA 63135)*



*The Cambria visits Rockcliffe on September 3, 1937, during a period of experimental passenger service trials from Great Britain. (Public Archives of Canada PA 63339)*

In 1935 the size of the base doubled, increasing the site to 376 hectares [930 acres] and many more new buildings were added. Of the new land, over 30 hectares [75 acres] were allocated to the Royal Canadian Mounted Police (RCMP) for training facilities and a crime laboratory; a 15-m right-of-way was reserved across the whole property to allow road access to Ottawa from the east. Among the new buildings, the DND Work Camp Project 27 built a brick photographic building (the well-known “White House”), radio station, central heating plant, and an addition to the Officers’ Mess. This government project was devised to relieve the terrible unemployment faced by many during the worst years of the Great Depression. These were the final major renovations to the base, which, until the RCAF ceased flying operations there in 1964, became one of the most important bases in the history of Canadian aviation.



*Imperial Airway’s Cambria during a brief stopover on the Ottawa River at Rockcliffe, September 1937. (Public Archives of Canada PA 63336)*



*Crew of Cambria being greeted by RCAF and government officials after arrival at Rockcliffe. Second from right is Hon C.D. Howe, Minister of Transport. (Public Archives of Canada PA 63334)*

## Rockcliffe: The Centre for Aeronautical Testing



*Air Vice-Marshal Ernest W. Stedman (1888-1957). (National Aviation Museum 26309)*

When the Air Board was formed in 1919 it was recognized that aeronautical testing and development work would be one of its major functions. In keeping with this mission, E.W. Stedman was appointed the Air Board's Director of Technical Services in 1920, and from that time until his retirement a quarter of a century later, he was in charge of aeronautical research and development for the RCAF. For many years, this activity was centralized at Rockcliffe.

Considered the air force's first aeronautical engineer, Stedman came to Canada from England in 1919 as Chief Engineer for the Handley Page Company. He was in charge of the Handley Page aircraft that was assembled for the attempt on the London *Daily Mail* prize, offered for the first successful non-stop flight across the Atlantic. However, Alcock and Brown beat them to the prize money and the glory by completing the crossing ahead of them in a modified Vickers Vimy bomber.

Later appointed to Canada's Air Board, Stedman's efforts resulted in the formulation of regulations governing the design of aircraft in Canada. Stedman joined the military when the RCAF was formed in 1924 and eventually rose to the rank of Air Vice-Marshal. In later years he was the first in Canada to suggest the formation of an organization to investigate jet propulsion. After retiring from the RCAF in 1946, he was appointed to the Engineering Department of Carleton College in Ottawa where he helped establish what is now Carleton University.

During the 1920s, the test flying of new aircraft for the RCAF was done at Ottawa Air Station. By 1930 a special Test Flight had been formed to do this work and, when war broke out in 1939, a small but sophisticated operation was in place. Its purpose was to carry out investigations pertaining to flight testing, electronics, gunnery, navigation, and any aeronautical work that affected training. The war effort caused a great increase in the demand for experimental test flying and the Test Flight was reorganized into the RCAF Test and Development Establishment in 1940. During the war years there were many different types of aircraft in the Establishment's hangars at any given time.

Every type of aircraft proposed for the RCAF was thoroughly tested prior to its acceptance. Specialists from the Establishment would inspect the aircraft and experienced pilots flew them to ensure that specifications were met. This was in addition to the developmental testing carried out by the manufacturers. The Test and Development Establishment would also write the pilot's handling notes for all types of service aircraft. Newly designed civilian aircraft were also tested for airworthiness at Rockcliffe until 1938.



*Handley Page Atlantic. In 1919 Stedman came to Harbour Grace, Newfoundland, as the engineer in charge of the Handley Page aeroplane that was competing for the Daily Mail prize for the first successful non-stop transatlantic flight, a prize won by Alcock and Brown in a Vickers Vimy. (Public Archives of Canada PA 63788)*



*The Test Flight experimented with a number of aircraft in the 1930s; investigative work included the analysis of oil dilution systems for winter starting and aircraft de-icing equipment. This photograph shows personnel refueling a Hawker Audax during winter trials at Rockcliffe in 1934. (Public Archives of Canada PA 62978)*



*Most of the RCAF's aircraft during the interwar years were either civil or training machines. A small transition towards a military force was made in 1936 with the selection of the Blackburn Shark II as the standard torpedo-bomber for coastal defence. The first of the type was erected in Ottawa following shipment from England, seen here warming up for its initial test flight at Rockcliffe in November 1936. (Public Archives of Canada PA 63190)*



*An RAF Hawker Hart undergoing winter tests at Rockcliffe in 1938. (Public Archives of Canada PA 63345)*



*Tests on fog landing equipment and the drop testing of parachutes are examples of the type of investigations that were carried out by the Test Flight in addition to the type testing of new aircraft. Here Mansfield fire-resistant asbestos suits are demonstrated at Rockcliffe in 1939. (Public Archives of Canada PA 63669)*



*A Hawker Hurricane of the Test and Development Flight seen in 1939. The Hurricane was the RCAF's first monoplane fighter. (Public Archives of Canada PA 63535)*



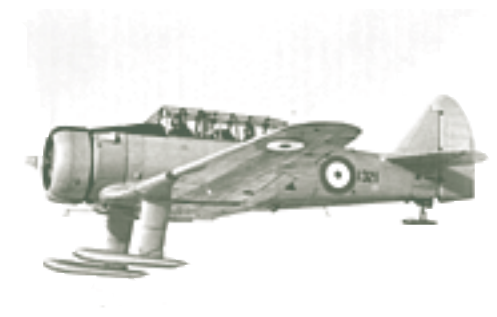
*The war greatly increased the demands for research and experimental test flying so that many different types of aircraft were seen at Rockcliffe at any given time. A Hawker Hurricane of No. 1 Squadron is being pushed into a hangar at Rockcliffe in 1939. (Public Archives of Canada PA 63513)*



*Ground crew servicing a Hawker Hurricane at Rockcliffe in September 1939. (Public Archives of Canada PA 63512)*



*Starting a Hawker Hurricane using a hand crank at Rockcliffe. (Public Archives of Canada PA 63511)*



*North American Harvard I on skis, another of the many aircraft types tested at Rockcliffe during the war. (Public Archives of Canada PA 64075)*

## The War Years



*Paved runways were installed in preparation for the war effort and the anticipated increase in activity at Rockcliffe, October 1939. (Public Archives of Canada PA 63481)*



*RCAF Station Rockcliffe moved into its wartime operation with an increase in personnel, buildings and units. Here, recruits form into flights near Lockheed Hudson I aircraft of No. 11 (BR) Squadron in September 1939. (Public Archives of Canada PA 63473)*

The name of the Rockcliffe site has changed many times over the years, reflecting its land use. Known as the Rockcliffe Rifle Range during the militia era, Ottawa Air Station during the Air Board years and then RCAF Station Ottawa, other names have included RCAF Technical Depot Stores and Number 1 Technical Depot. Again renamed RCAF Station Ottawa in 1936 and then RCAF Station Rockcliffe in 1940, the last changes suggest the growing pre-war importance of the site. By 1940, wartime operations were well under way with increases in the numbers of operating units and personnel. The aerial survey activities were, for the most part, suspended during the war but the Station carried on with its transportation and aircraft testing functions. The base was also the site of many training schools that sprang up during the war for photography, fighter control, aircraft recognition, communication, and a testing kitchen, which experimented with quantity, quality and delivery of food to men in combat.

This tremendous increase in activity occurred right across Canada as the country geared itself up for the war effort and adapted to meet the requirements of the British Commonwealth Air Training Plan (BCATP). Canada's greatest single contribution to the Allied war effort, this huge air training scheme built over 100 new airfields, 105 flying training schools and 184 support units across the country. By 1943, 11 000 aircraft were on strength with the BCATP and training staff numbered 104 000. Eventually, over 131 500 aircrew from a number of nations were trained for service overseas, leading Franklin Delano Roosevelt to refer to Canada as the "aerodrome of democracy." This tremendous increase in activity translated into demands on the RCAF Test and Development Establishment in the areas of flight testing, electronics, gunnery, navigation, and any other aeronautical work that affected Allied training.





*Of the many activities carried out on the station during the war, one unique to Rockcliffe was the establishment of an RCAF School of Photography. (Department of National Defence PL 2236)*

Rockcliffe had witnessed a tremendous growth since it was first established in 1920. In 1922, there were two aircraft and a staff of 18 officers, airmen and civilians; in 1932, there were 19 aircraft (10 types) and a staff of 92 officers and men. By October 1943, when the air force was near its peak, there were 1401 officers, airmen, airwomen, and civilians at the Station, with another 1390 air force personnel at the W.D. Manning depot. In addition, Rockcliffe treated all armed forces personnel in the Ottawa area at its hospital.



*After an airman successfully completed his initial and secondary training and before he entered operational training, he was awarded his pilot's wings at a Wings Parade. This Wings Parade was held at Rockcliffe in August 1940 during Air Vice-Marshal Croil's inspection. (Department of National Defence PL 2132)*



*In contrast to the halcyon days of the 1930s, a tremendous increase in activity occurred at Rockcliffe during the war years. Through this barracks window can be seen a squadron of Lockheed Hudson aircraft parked on the tarmac. (Department of National Defence PL 8307)*



No. 110 (Army Cooperation) Squadron. This unit was the first RCAF squadron to go overseas in the Second World War; the men completed their training at Rockcliffe before proceeding by train and ship to England in February 1940. (Department of National Defence PL 383)

No. 110 (Army Cooperation) Squadron, the first RCAF squadron to go overseas, trained and “worked up” to operational readiness at Rockcliffe before the men proceeded by train and ship to England in 1940. At this time operations had begun on the south side of the airfield as new hangars were constructed below the rocky cliffs that divided the Station. (The National Aeronautical Collection moved into three of these “temporary” Second World War hangars in 1964.)



Westland Lysander aircraft of No. 110 Squadron seen here operating from the south side of the field. (Public Archives of Canada PA 63638)



No. 110 Squadron air crew during training at Rockcliffe prior to going overseas, January 1940. (Public Archives of Canada PA 63659)



No. 110 Squadron Lysander preparing to take off on gunnery practice, January 1940. (Public Archives of Canada PA 63650)



*RCAF No. 110 Squadron departing for overseas, February 1940. (Public Archives of Canada PA 63838)*



*Station maintenance included rolling snow on airfield runways for winter operations, January 1940. (Public Archives of Canada PA 63652)*



*Construction of three more hangars on the south side of the field in 1942. The National Aeronautical Collection moved into these buildings after 1964. (Public Archives of Canada PA 64124)*



*No. 168 Squadron aircrew of a converted Boeing B-17 Flying Fortress that flew mail over the hazardous North Atlantic to servicemen overseas during the war. (Department of National Defence PL 23186)*

Another unit that was unique to RCAF Station Rockcliffe during the war was the heavy transport squadron that centralized and delivered armed forces mail to the troops overseas. No. 168 Squadron was formed in 1943 to carry this mail, flying over the hazardous North Atlantic to Great Britain and points beyond. At first they employed well-worn Boeing B-17 Flying Fortress bombers, which had been modified into “flying mail trucks” by moving the crew positions to maximize their internal storage capacity. In 1944 the squadron received Consolidated B-24 Liberators for this work. When the unit disbanded in 1946, it had completed 636 Atlantic crossings. Including operations from Great Britain, over 1000 metric tons of mail, 4000 metric tons of freight and 42 057 passengers were transported. One of the squadron’s VIP Liberators carried distinguished passengers, such as members of the Royal Family, the Governor General and Prime Minister Mackenzie King.



*The inaugural mail flight to servicemen overseas takes off from Rockcliffe on December 15, 1943. The view to the northwest shows a control tower, which has been added to the 1928 hangar. (Department of National Defence PL 23355)*



*Mail and freight are loaded into a Liberator for the Overseas Mail Service, Rockcliffe, 1945. (Public Archives of Canada PA 65294)*



*B-24 Liberators of 168 Squadron at Rockcliffe, 1945. Squadron aircraft had completed 636 Atlantic crossings and carried over nearly 1000 metric tons of mail by the time the unit was disbanded in 1946. (Public Archives of Canada C80763)*



Three photo-reconnaissance Spitfire Mk.Vs operated from Rockcliffe near the end of the war, an aircraft type seldom seen in Canada during the war years, February 1944. (Public Archives of Canada PA 68006)

An aircraft type that was rarely seen in Canada was operated from Rockcliffe for a period of time during the later war years. Three Spitfire Mk.Vs came to Canada in 1943 and were employed in photo-reconnaissance work with No. 13 Photo Squadron. In total, the RCAF had only eight Spitfires of various marks on strength in Canada. Two of them, along with a Spitfire Mark.IX, are now part of the National Aviation Museum’s aircraft collection.

As had happened during the First World War, the stimulus of war hastened aeronautical development and, at the end of the conflict, rockets and jet aircraft were introduced to the world. Rockcliffe witnessed Canada’s entry into the jet age when the RCAF demonstrated a Gloster Meteor F.III to a group of air attachés on the site in September 1945.

The years from 1945 to 1950 saw numerous changes in the units based at Rockcliffe, but its three main pre-war functions of aerial survey, transport, and test and development remained basically the same into the first half of the 1950s.



One of three Spitfire Mk.Vs, X4492, employed in photo-reconnaissance work from Rockcliffe at the end of the war. (Department of National Defence PL 20225)



Rockcliffe witnesses Canada’s entry into the jet age as a Gloster Meteor F.III is demonstrated to a group of air attachés in 1945. (Department of National Defence PL 37104)

## The “Rockcliffe Ice Wagon”

An interesting program of research that began at Rockcliffe after the war was a study of aircraft icing conditions carried out by the RCAF in collaboration with the National Research Council. The program began in 1946 and employed a Consolidated Privateer dubbed the “Rockcliffe Ice Wagon.” With a group of NRC scientists aboard, it would take off whenever particularly bad icing conditions were reported, deliberately flying in poor weather to obtain useful data. This work proved instrumental in the development of improved aircraft de-icing equipment. The 1950 version of the “Rockcliffe Ice Wagon,” a Canadair North Star, was a Canadian variant of the Douglas DC-4 powered by Rolls Royce Merlin engines.



*The first “Rockcliffe Ice Wagon,” a Consolidated Privateer, parked at Rockcliffe in 1946. (Public Archives of Canada PA 65976)*

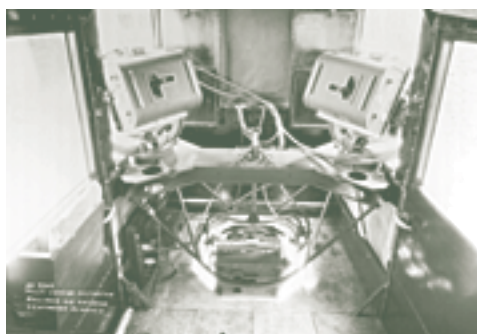


*The 1950 version of the “Rockcliffe Ice Wagon” was this modified Canadair North Star. (Public Archives of Canada PA 66191)*

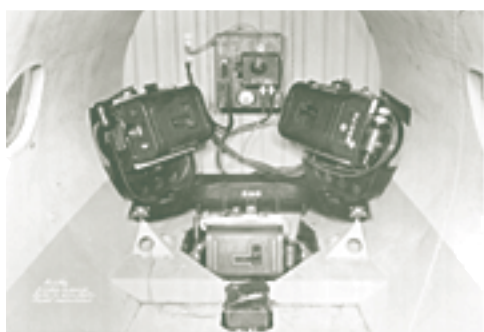




The development of aircraft, equipment and aerial photographic methods continued throughout the 1920s and 1930s. Shown is a multi-camera installation in an RCAF Bellanca Pacemaker, Rockcliffe, 1935. (Public Archives of Canada PA 63075)



Cabin installation of aerial cameras in RCAF Bellanca Pacemaker, showing the multi-camera approach, Rockcliffe, 1935. (Public Archives of Canada PA 63078)



Multi-camera installation in cabin of RCAF Fairchild Super 71, Rockcliffe, 1936. (Public Archives of Canada PA 63181)



Exterior view of multi-camera installation in a Fairchild Super 71, Rockcliffe, 1936. (Public Archives of Canada PA 63180)



RCAF Fairchild Super 71, Rockcliffe, 1936. This was the first Canadian-built aircraft with an all-metal, monocoque fuselage. (Public Archives of Canada PA 63184)





Types of aerial photographic cameras used by the RCAF in 1945. (Public Archives of Canada PA 65562)



Crew pose beside North American B-25 Mitchell aircraft of No. 13 Photo Survey Squadron, Rockcliffe, 1944. (Public Archives of Canada PA 65140)

In the summer of 1944, an RCAF Canso amphibian and four Norseman sea-planes carried out an aerial survey of the Ungava Peninsula, Baffin Island, and the west coast of Hudson’s Bay. The purpose of the survey was to establish ground controls for aerial mapping and it became evident that the existing maps of northern Canada were inaccurate. Thus, the aerial surveying of Canada’s North was tasked to the RCAF and became one of its major roles in the following years, with all photographic activity centralized at Rockcliffe until the RCAF aerial survey of northern Canada was completed in 1957.

A method of navigation was required that would accurately place the camera aircraft over the terrain to be photographed so that accurate flight paths could be established. SHORAN was a radio navigation system developed during the war that was based on triangulation. It utilized transmitting stations set up in moveable camps on the ground, which sent signals to a receiver in the aircraft. Employing this system, two ground stations were sited on known survey markers and, as the aircraft flew along, it interrogated both sites for distance. Knowing the baseline between the two sites and the distance from each of them to the aircraft gave three sides of a triangle whose apex pinpointed the position of the aircraft. The crew could then keep the aircraft on an accurate, fixed path. Three cameras were mounted in the aircraft’s cabin to photograph the terrain below from horizon to horizon and the SHORAN readings were recorded on film. These tri-metrogon photographs were arranged on a grid at the Photo Establishment and then indexed for government personnel who plotted the maps. The photos allowed for stereoscopic views to be arranged in order to determine the land contour information required for the maps.



Camera installation on B-25 Mitchell for tri-metrogon mapping process, 1944. (Public Archives of Canada PA 65503)



*Photographic crews being briefed in 1945 prior to tri-metrogon mapping mission, 1945. (Public Archives of Canada PA 65587)*



*Print layout room, RCAF Photographic Establishment, Rockcliffe, 1945. (Public Archives of Canada PA 68026)*



*RCAF photo technician indexing tri-metrogon prints for plotting maps, 1945. (Public Archives of Canada PA 65218)*



*A government technician plots map from information derived from tri-metrogon aerial photographs taken by the RCAF, 1945. (Public Archives of Canada PA 65579)*



*SHORAN camp and antennae, 1950. These ground stations sent radio signals, which were received by the aircraft as part of a radio navigation system that accurately placed the aircraft over the terrain to be photographed. (Public Archives of Canada PA 66363)*



*Living conditions at an isolated SHORAN ground station camp, 1949. (Public Archives of Canada PA 66513)*



*Installation of cameras in a photo squadron Avro Lancaster, 1947. (Public Archives of Canada PA 65920)*



*Douglas Dakotas of No. 414 Photo Squadron at Rockcliffe, 1949. (Public Archives of Canada PA 66119)*



*No. 408 Photo Squadron Lancaster and crew at a northern base. By 1949, the Photo Establishment at Rockcliffe had carried out the largest program of aerial photo survey anywhere in the world. (Public Archives of Canada PA 66067)*



*Camera installation in an RCAF Dakota, 1950. (Public Archives of Canada PA 66320)*



*Routine maintenance on a Lancaster carried out at a northern base camp detachment, 1948. (Public Archives of Canada PA 65859)*



*An engine change is being carried out on this Photo Squadron Dakota at Norman Wells, N.W.T., in July 1950. Aircraft heading to their northern bases from Rockcliffe took their own ground crews, including cooks. (Public Archives of Canada PA 66428)*



*Most of the photo survey work was done by Lancaster, Mitchell, Dakota and Norsemen aircraft, with Consolidated Cansos used as supply aircraft, 1950. (Public Archives of Canada PA 66466)*



*RCAF Noorduyn Norseman photo aircraft at its detachment base at Lac La Ronge, Saskatchewan, in 1950. (Public Archives of Canada PA 66471)*



*Photographic Lancasters at Resolute Bay, N.W.T., in June 1950. The aerial surveys of the North carried out by the RCAF in the 1940s and 1950s played a major role in the development of Canada and visible evidence of this work still exists in modern maps of Canada. (Public Archives of Canada PA 66233)*

In 1948, Rockcliffe photo crews covered 2.4 million km<sup>2</sup>, an area equal to all the previous coverage up to that time. By 1949, the Photographic Establishment at Rockcliffe had carried out the largest program of this nature in the world. Visible evidence of their work still exists in modern maps of Canada. Most of this work was done using Lancaster, Dakota and Norseman aircraft, with Cansos used for delivering supplies. Photo survey work continued into the 1950s, when the fears of the early Cold War years produced new Canadian defence requirements. This included an early warning radar system that would alert North America to aerial attack by Soviet forces from the direction of the polar regions. In 1954, No. 408 Photographic Squadron conducted a survey for the Mid-Canada Line, employing the largest complement of aircraft in survey history. (The Mid-Canada Line was a chain of radar stations built across Canada in 1957 at 55°N latitude.)

## Changing Times

Rockcliffe's three main functions (aerial survey, transport and flight testing) remained basically intact during the first half of the 1950s. However, the military aerial survey of Canada's North ended in 1957 and further survey requirements were taken over by other government departments. After 37 years, the flight testing and development operations ceased as the Central Experimental and Proving Establishment (CEPE) moved south of Ottawa to RCAF Station Uplands, a move necessitated by the longer runways required for testing new generations of jet aircraft. However, the popular annual Air Force Day events begun in the early 1950s continued well into the 1960s at Rockcliffe's airfield.



*During the 1950s and 1960s the RCAF hosted a number of popular Air Force Day events at Rockcliffe with aerial displays and static ground exhibits. The flight line is shown here during the June 1951 exhibit. (Public Archives of Canada PA 67415)*



*This early 1960s lineup of traffic at Rockcliffe's front gate attests to the popularity of the annual Air Force Day events. (Department of National Defence PL 144500)*



*Large crowds throng throughout the static display area during the June 1955 Air Force Day at Rockcliffe. (Public Archives of Canada PA 68668)*



*Air Force Day, Rockcliffe, June 1964. This scene from the flying field shows the barriers holding back the crowds hoping for a good view of the flying activity about to begin. (Department of National Defence PL 144602)*



*Station and Base Commanders, Rockcliffe, 1922-1972. (Department of National Defence RE72-1300)*

In 1954, Station Rockcliffe became a unit of Air Materiel Command (AMC) and its headquarters was located there. The broad function of AMCHQ was to carry out the logistical policies and plans of Air Force Headquarters, located in Ottawa, for all RCAF activities and operations. As the last remaining sections of the former air station at Rockcliffe were officially closed by the government several years ago, in 1999, this unit is in the final stages of preparing to vacate the site in anticipation of plans to develop the area.

In 1964 the RCAF ceased flying operations at Rockcliffe, and, at this time, the RCAF's historic aircraft collection was moved into the abandoned hangars built during the Second World War. Combined with the aircraft collections of the Canadian War Museum and the early National Aviation Museum, the National

Aeronautical Collection was established. Evolving into the present National Aviation Museum, this invaluable collection of vintage civil and military aircraft moved, in 1988, into its present purpose-built facility situated in the centre of the former airfield.

Although the RCAF no longer flew from the airfield, it continued to be used by the Rockcliffe Flying Club. For a period of time, it was also used by Air Transit, the government funded STOL (short takeoff and landing) trial service to Montreal. From 1974 to 1976 it was the only civilian passenger service to operate from the site. The terminal building and hangar erected for the feasibility study were incorporated into the present Museum facility.

When necessary, the Museum can use the remaining runway and river slipway for taking delivery of aircraft for its collection. As the home of one of the world's more significant historic aircraft collections, the Museum's location on such a historic airfield provides a fitting continuity to the distinguished aeronautical legacy that was established by the airmen and engineers of the past.



*Aerial photograph taken around 1960 at the height of RCAF Station Rockcliffe's development. The three Second World War hangars (mid-upper left) housed Canada's national collection of historic aircraft from 1964 to 1988. (Department of National Defence PL 100089)*



*After the RCAF ceased flying operations at Rockcliffe in 1964, Canada's National Aeronautical Collection was established and housed in these three Second World War hangars on the south side of the field. (National Aviation Museum 18949)*





*The new National Aviation Museum building under construction in 1985. At the mid-left can be seen the three Second World War hangars, which had housed the collection since 1964. The Museum has used the old slipway at the bottom of the photograph to take delivery of several seaplanes in its collection. (National Aviation Museum 17390)*



*This aerial view of Rockcliffe's lower level shows the start of demolition of the hangars formerly occupied by the Museum (upper right). The Photographic Establishment "White House" (upper left) was torn down after the new National Aviation Museum opened in 1988. (National Aviation Museum 22032)*



*Today, none of the former air force buildings on the airfield level exist. The north part of the field is now home to the Rockcliffe Flying Club. The National Aviation Museum, housing one of the world's more significant historic aircraft collections, provides continuity to the site's distinguished aeronautical heritage. (National Aviation Museum 198811)*