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Anti-submarine Warfare Pioneer to Bush Pioneer: The HS-2L in Canada



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The Original Use



Curtiss HS-2L (serial number 1876) being launched from Dartmouth, Nova Scotia in 1919.

Christopher Terry, the former director general of the Canada Aviation Museum, recounts the history of Curtiss HS-2L La Vigilance—the country’s first commercial aircraft—and describes its recent restoration.

When the magnificent new building housing the National Aviation Museum of Canada (now renamed the Canada Aviation Museum) opened at Ottawa (Rockcliffe Airport), Ontario in June 1988, pride of place among the exhibits went to the recently completed reconstruction of *La Vigilance*, a Curtiss HS-2L flying-boat. It is the only example of its type in the world.

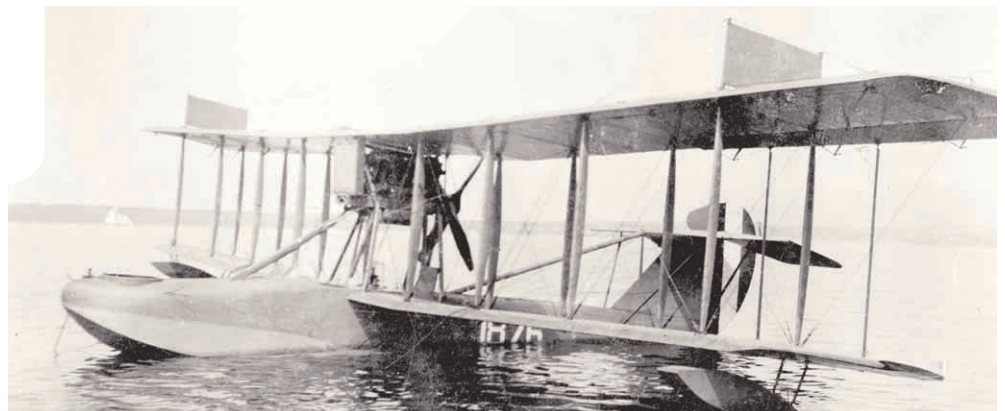
This type of aircraft occupies a special niche in Canada’s aviation history. The original *La Vigilance* held many firsts. It was the first commercial aircraft in Canada. Canadian operated HS-2Ls flew the first regularly scheduled passenger air service in Canada, and were used for the first Canadian airmail service. In fact, the HS-2L broke the ground for the tradition of “bush flying” which characterized so much of Canadian aviation from its earliest days.

The Curtiss HS-2L made its first appearance in Canada in the summer of 1918. By that time, the use of aircraft in anti-submarine

operations had been well established in Europe. Faced with a continuing threat from German submarines or U-boats operating on the convoy routes across the North Atlantic, the government of the United States (USA) was anxious to establish an airborne maritime patrol capability based on the eastern extremities of the North American continent. The Canadian government of the day had set in motion a scheme to create a Royal Canadian Naval Air Service but it was not in a position to provide airborne offshore convoy escort as quickly as the Americans required it. The solution adopted was the establishment of two US Naval Air Stations at Dartmouth and North Sydney, Nova Scotia, from which patrols were to be flown by US Navy (USN) crews under the command of Lt. Richard E. Byrd. The equipment to be used included blimps, kite balloons and Curtiss HS-2L flying-boats.

The Curtiss HS-2L was an improved version of the earlier HS-1L which, itself, was a single

The same boat, Curtiss HS-2L photographed at Halifax, Nova Scotia in 1918.





G-CAAC with sister ship G-CAAD at Laurentide base, Manouane, Quebec in 1921.

The first opportunity to do so came in the summer of 1919 when the Canadian government was requested to lend two of the HS-2Ls to the St. Maurice Forestry Protective Association in Quebec. This organization was operated by the Laurentide Paper Company and other paper companies whose chief forester, Elwood Wilson, had recognized the value of aircraft for use in fire patrol duties.

The request for two aircraft was granted and the Laurentide Paper Company hired Captain Stuart Graham to ferry the aircraft from Dartmouth to their new base at Grand-Mère on Lac à la Tortue, Quebec. The first aircraft, formerly US Navy A-1876, left Dartmouth on June 5, 1919. Graham was accompanied on this flight by his wife Marguerite (Madge) and his engineer, William Kahre. The flight, which covered 645 miles (1,040 km), took 9 hours 45 minutes flying time over four days. It was the longest cross-country flight to that date in Canada and the first long-distance flight for a woman. The three crew members returned to Halifax by ferry and rail and took off with the second machine, formerly US Navy A-1878, on June 21. This delivery flight took 12 hours 20 minutes flying time, spread over three days, to complete.

The aircraft were quickly put into operation on their forestry patrol duties, and two weeks after completing the delivery flights,

Graham and Kahre reported the first forest fire sighted from the air in Canada. These flights represented the start of commercial flying in Canada and the beginning of bush flying which has characterized so much of Canadian aviation. They were the first of a long line of trailblazing accomplishments chalked up by the HS-2L in active civilian use.

During the 1919 season, 57 flights were made and some 80 hours of flying time accumulated. Chief among the accomplishments were the first experiments with aerial photography for forestry purposes. It was shown how topography and ground cover could be plotted with great accuracy.

Despite this progress, the Forest Protective Association did not feel its continued support of the aerial patrol activity was warranted. The Laurentide Paper Company felt differently, however, and secured the service of two flying-boats for its exclusive use. Forest surveys and fire protection patrols continued throughout 1920 and 1921. During this time, Canada adopted a set of Air Regulations governing the operation of civil aircraft and the licensing of all personnel, airports and air harbours. As a consequence of the adoption of these measures, the former A-1876 was registered G-CAAC in June 1920 and the second aircraft registered G-CAAD that September.

At the end of 1921, the Laurentide Paper Company decided that it could no longer bear the exclusive cost of running the flying

operations. To permit its continued access to the aircraft, however, the company entered into an agreement with one of its pilots, W.R. Maxwell, that if he could start a company to operate the aircraft, it would provide sufficient work to maintain the firm until other work was found. This led to the formation of Laurentide Air Service Ltd. The company was financed largely by Thomas Hall who had moved to Montreal from Great Britain in 1902. Hall owned a marine engineering and shipbuilding firm and took the role of president in the new company.

Laurentide Air Service Ltd. was given all of the facilities constructed by the lumber company for its aviation operations. It permitted the new firm to establish an impressive record from the start, including flying over 688 hours during the season and carrying 659 passengers. At this time, contract work was started for the Ontario Department of Lands and Forests which wished to have a survey of forests carried out in Northern Ontario. This involved considerable sketching of forestry resources from the air.

The Crash and Recovery



Curtiss HS-2L G-CAAC pictured following its crash in Foss Lake, Ontario on September 2, 1922. The port wingtip float dug into the water during take-off. The remains lay in the lake until 1968.

Because of the limited range of the HS-2Ls in their operating environment, it was necessary to establish fuel dumps to permit operations away from the main bases. On September 2, 1922, while involved in such a mission, G-CAAC, which had earlier been named *La Vigilance*, crashed.

The aircraft was being flown by Don Foss who was accompanied by his air engineer, Jack Caldwell. While returning to their home base on Remi Lake, close to the northern Ontario community of Kapuskasing, the weather closed in and Foss thought it prudent to land on a small unidentified lake. This was accomplished and while the crew waited for the weather to improve they lightened the aircraft to shorten the take-off run. On leaving the water, Foss had to make a turn to clear the shoreline. The port wingtip float struck the water and the aircraft crashed close to the shore. The crew were uninjured and walked out of the bush. They subsequently returned to confirm the damage to the aircraft. The hull was found to have been broken in the cockpit area and just behind the lower wing. In the winter of 1922-23 a salvage crew recovered the Liberty engine, but it was found to be beyond repair and was scrapped.

The remains sat on the bottom of the lake in shallow water until 1968. Two years earlier, in 1966, Robert W. Bradford, then curator of the National Aviation Museum, had been told by Don Campbell, a Kapuskasing businessman and pilot, that he had heard of an

HS-2L that had crashed in the area in the 1920s. In mid-September 1968 Campbell telephoned Bradford to report that, while on a local flight with an air cadet, the cadet, Dennis Major, had seen what appeared to be the wreckage of an aircraft submerged in a small lake. This report resulted in Bradford's departure post-haste for Kapuskasing to investigate, and the Ontario Department of Lands and Forests being asked for the loan of a locally-based Bell Jet Ranger to conduct an initial reconnaissance.

On Friday, September 20, 1968, the Jet Ranger crew with Campbell and Bradford aboard located the wreckage. The helicopter pilot landed on the lake over the wreck site, and with the aid of a pulp hook, Bradford was able to bring to the surface sufficient components to enable the aircraft to be identified as an HS-2L. The next day, Bradford and Campbell returned to the lake in a de Havilland Canada Beaver of White River Air Service. Using a canoe brought in on one of the Beaver's floats, and grappling hooks supplied by the local police, the two were able to make out that the only fully recognizable part of the aircraft was the rear of the hull, and that the forward upper part of the hull had disintegrated altogether. The grappling hooks brought up the rudder of the aircraft, and from its condition the preservative qualities of the thick layer of silt on the bottom of the lake became apparent; anything which had sunk into it was well preserved; parts exposed to the water had



Foss Lake from the air in 1968.

On the second day, in a steady downpour, the divers were able to clear the silt from around the remains of the hull.

deteriorated beyond redemption. All parts which had been retrieved were immersed in a Carbowax 1540 mixture to prevent the wooden parts from disintegrating as they dried out. This was the same treatment developed for the preservation of the *Vasa* after her recovery from the bottom of Stockholm harbour some years earlier.

On the second day, the two were joined by Campbell's son and assisted by the use of a second canoe which was lashed to the first to form a catamaran. They also had obtained a glass-bottomed box with which the remains could be observed from the surface. The second day's catch included the front edge of the cockpit coaming and the engineer's windscreen, as well as many pieces of fabric. It was enough for Bradford to recommend to his superiors that the recovery continue before winter set in.

Further efforts were made at the end of September. A base was established and Bradford and two of the Museum's staff were able to raise additional pieces before the weather deteriorated and operations had to be suspended for the year.

Over the winter of 1968-69, Bradford worked to establish the identity of the aircraft. He learned from Stuart Graham, the original delivery pilot, that Don Foss was still living in Grand-Mère, Quebec. This lead was followed up and Foss was able to confirm

the identity of the aircraft as G-CAAC and provide details of its crash. Further correspondence with Stuart Graham also confirmed that G-CAAC was indeed *La Vigilance* and as such was of inestimable historical importance as the aircraft that had carried out the first bush-flying operations in Canadian aviation history.

The following year, the Museum initiated a complex recovery operation. It involved several of the permanent staff assisted by four local air cadets, Mac McIntyre of the Canadian Aviation Historical Society who had experience with a similar recovery operation on a Fleet Freighter, the Aquajets scuba club from North Bay, Ontario, equipment donated by the Federal Department of Energy, Mines and Resources, and air support in the form of a de Havilland Canada Turbo Beaver (CF-OEP) belonging to the Ontario Department of Lands and Forests.

The operation got under way at the lake on August 7, 1969. The first day was spent ferrying in supplies and constructing a large U-shaped raft from 45 gallon oil drums and plywood. The divers were also active, bringing up parts of the wing spars and the overhead gravity copper fuel tank. They also detected the existence of major parts of the lower front hull section.

On the second day, in a steady downpour, the divers were able to clear the silt from



Final proof: remains of the registration letters “G-CAAC” on the starboard side of the hull.

around the remains of the hull. This was accomplished by sucking the silt away with two high-pressure hoses with screens fixed across the inlets of the hoses to trap any small items dislodged by the suction. Along with the 34 ft (10.4 m) length of hull, the divers also brought up numerous artefacts in surprisingly good condition. This included several of the instruments and many of the spare parts and tools normally carried by HS-2L aircrews in the 1920s.

Over the weekend, the hull was partially raised by lashing 45 gallon oil drums to it and then blowing out the water with the pumps to provide buoyancy. It was then towed, submerged, to the closest shoreline and then to the site of a slipway made out of plywood. Before the divers left, they brought more valuable artefacts to the surface, many of which have since been incorporated into the restored airframe.

On pulling the hull from the water, the expedition was thrilled to discover that one section of planking on the rear hull bore the painted registration G-CAAC, thereby establishing the aircraft’s identity beyond a doubt. To honour the occasion, Barry MacKeracher, one of the Museum staff, piped the remains ashore with his bagpipes — which he had brought along for just such an eventuality.

The next part of the operation involved the transport of the remains to Kapuskasing from the lake site. This was accomplished by cutting the hull in two, after which it was subjected to the Carbowax 1540 treatment. As the hull was washed out, many other

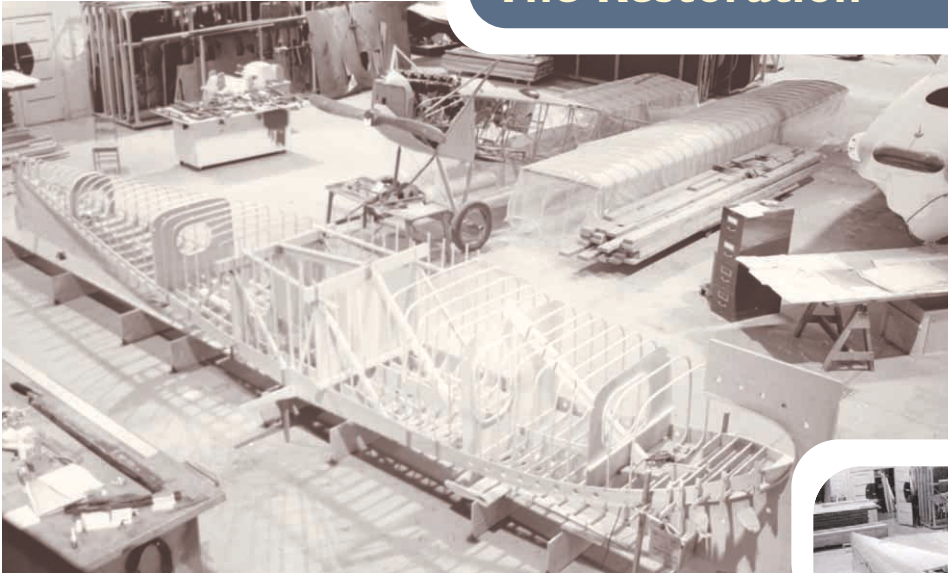
loose items were recovered. The actual removal of the hull and associated remains was carried out by a Canadian Armed Forces Piasecki H-21 helicopter of 424 Sqadron which had been engaged in a Search-and-Rescue mission in Northern Ontario. The front hull was enclosed in an open crate which was slung below the helicopter. The rear hull and the other remains were carried in the cabin. On September 13, the remains were airlifted to Kapuskasing and the following Wednesday left for Ottawa by road.

Following an extensive treatment in Carbowax 1540, the remains were put on display in the Museum pending the commencement of the planned restoration programme. Among the many visitors to see the display were Stuart and Madge Graham who had flown in the aircraft in 1919, and Don Foss who had been the last pilot. In recognition of his inadvertent part in the preservation of this priceless piece of Canada’s aviation past, Bradford applied to have the lake in which G-CAAC had reposed for 47 years named in Don Foss’s honour. As the lake had no official name, the Canadian Permanent Committee on Geographical Names granted the application in October 1969.

Fire extinguishers and tools, some found in the hull and others found in the silt below the hull.

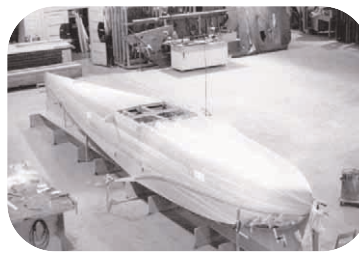


The Restoration



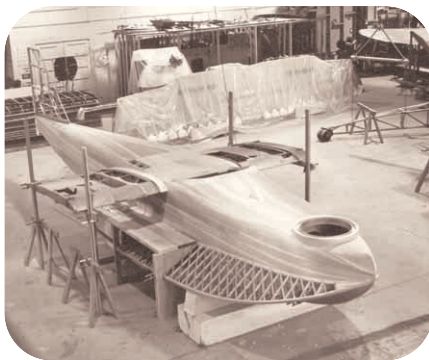
Left, an early stage of the restoration of G-CAAC, showing the upper bulkhead frames and chines in place. In the background is the Museum's Fokker D-VII.

Below, the fully planked hull of G-CAAC showing the left location of the sponson anchoring strip.



Below, fitting the stub wings to the nearly finished hull of G-CAAC in 1978.

Below right, the complete hull of G-CAAC with final installation of the restored tail empennage — 1979. The observer's cockpit opening and additional passengers' cockpits had by then been cut out of the hull.



Some 4 years after the remains had been brought to Ottawa, the job of rebuilding the HS-2L began. A major decision was made at the outset that it was simply not practical or desirable to restore the original hull. So, in 1973, the Museum staff began the long and difficult job of researching how to build a new one from scratch. The process was to take 14 years as, because of the demands of their other duties, the restoration staff could work on the project for only about one week in four. In addition, during most of the project, funds for such reconstruction activities were almost non-existent.

Unlike the 1918 production lines, replete with manpower and jigs which had churned out HS-2L machines at a great pace, the Museum staff were on a continual learning curve. One potential

problem was overcome when John Elliott (Major, USMC Ret'd.) of the US Navy's History Office in Washington located and arranged for the donation of about 60 per cent of the drawings needed for the job.

A keel of ash laid down in September 1975 was the starting point. It was formed in a steamer made from a 45 gallon oil drum with heating elements from a local hardware store. The pine hull planking was similarly steamed, shaped and individually fastened using innumerable clamps and thousands of brass screws. Each plank took about two weeks to install. The coaming for the front gunner's cockpit was made up from dozens of laminations and the hole cut in the hull with great trepidation. Contrary to fears, the hull did not disintegrate when the saw was applied!

