CANADA AVIATION AND SPACE MUSEUM AIRCRAFT
de HAVILLAND D.H.80A PUSS MOTH
REGISTRATION CF-PEI

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Introduction

After the stunning success of the earlier Moth light aircraft with the civil market and the many prolonged long distance flights, prospective buyers started to request a more comfortable aircraft. They wanted a closed cockpit with interior heating. This was brought home to Captain de Havilland when he and his wife were returning from Africa and crossed the Pyrenees. With this in mind, de Havilland designed the Moth Three. This was a three seat, high wing, enclosed and heated cabin monoplane. The engine was a Gypsy III, inverted in-line engine to allow an improved forward view for the pilot. An interesting and useful feature to induce drag was included in the prototype D.H.80 Moth Three (this will be described in the section designated "Undercarriage"). The prototype was built completely of wood and considering the desires of overseas customers, production was delayed until the fuselage was redesigned to incorporate a welded steel framework. This then became the D.H.80A Puss Moth. Prototype No.1 (D.H.80 Moth Three), made its first flight on 19 September 1929. The second prototype completed its first flight during March 1930. Both flights took place at Stag Lane Aerodrome in Middlesex UK, the location of the offices and plant of the de Havilland Aircraft Company Ltd. The model then went into production later in March 1930.

Design and Development

Fuselage. The D.H.80A Puss Moth had a fabric covered fuselage over a welded steel framework with a single door on each side of the cockpit. The fuselage, built in two sections, was bolted together at the hinge area of the doors. The steel framework used square-section tube for the longerons with round

Cover Photo Caption:
D.H. 80A Puss Moth CF-PEI on arrival at National Aviation Museum (NAM), now the Canada Aviation and Space Museum), (Museum photo 13096).
tubing to support the engine and the front section with round tubing in the rear. The front section also provided a firewall was constructed between the engine and the cockpit, as was common to all single engine aircraft. The framework of the fuselage was covered with linen fabric separated from the steel frame by wooden stringers attached to the framework along the length of the fuselage.

**Cockpit.** The cockpit was pleasingly fitted out, also very functional. The rear passenger seat mounted on rails which could be moved on an angle towards the front, seating was very comfortable. The three piece windshield along with the inverted engine gave the pilot excellent forward vision and was glazed as were the side windows. The overhead clear Cellon skylight added light to the cockpit and offered a view over the wings.

*View of the cut back and tapered wings at the cabin roof. (Portion of Museum photo of CF-PEI).*
Wings. The two wings were manufactured separately and attached with fittings to the longerons at the top of the cabin. The root of each wing and the D-section leading edge of each wing was tapered and cut back allowing for the maximum vision through the clear Cellon panel in the roof. The D-section leading edges were covered with birch plywood and extended back to the main spar. Wing ribs were spruce, internally braced with cables and piano wire while allowing room for the installation of the fuel tanks. The ailerons were about half the length of the wing span and were located on the trailing area of the wings. The flaps were located on the trailing edge, from the fuselage out to the ailerons. The wings were built so they could be folded back alongside the fuselage. This feature saved hangar space and allowed the aircraft to be towed by a vehicle, enroute to a new location. This was a common design feature for many light aircraft of that era.

DH 80A Puss Moth registration CF-AGO with floats, being towed, probably on a service road, to a launching ramp. (Museum photo 8285).

CF-AGO at the launch point. (Museum photo 5417).

CF-AGO safely afloat and ready for take-off. (Museum photo 4859).
**Undercarriage.** The split undercarriage of the *Puss Moth* is a little complicated. There are lift struts forming a vee, connecting and bracing the wing to the lower longeron of the fuselage. Compression legs are streamlined elliptical steel tubes forming a vee and are connected from a wheel axle tube to the upper longeron of the fuselage. The compression legs are telescopic and filled with rubber compression blocks to act as shock absorbers. By means of linkage to the cockpit, the pilot can rotate these legs 90 degrees in flight, so that the width of the legs act as a speed brake against the air flow and slow the aircraft, steepening the glide slope and providing a shorter than normal landing run.

**Powerplant.** The engine installed in the *Puss Moth* was a de Havilland Gipsy III, four cylinder in-line unit developing 120 hp. The engine was mounted upside down to allow improved forward view for the pilot (with the engine mounted upright, the cylinder heads protruded through the fuselage in full view of the pilot). When the engine was inverted, some modifications allowed the engine to perform flawlessly.

**Use with the Military.** The Royal Air Force (RAF) in the United Kingdom (UK) purchased some *Puss Moths* when they first were available but could not find a suitable role for them. Around 1939-40, some *Puss Moths* were impressed from various private owners for use as communication aircraft with the RAF.

The Royal Canadian Air Force (RCAF) had planned to purchase the *Puss Moth* and orders were placed with de Havilland Canada Ltd. (DHC), for 17 aircraft already assembled at the DHC plant. This was prior to the realization by the Federal government of the impact of the depression which would constrict spending. Four of the 17 were provided to the Civil Government Air Operations (CGAO), located at Rockcliffe Airport.
and the remaining 13 were flown to RCAF Camp Borden. CGAO aircraft were received at Ottawa Air Station Rockcliffe, Ontario and Winnipeg, Manitoba. While looking for a useful standard for the use of the *Puss Moth* amongst the many aircraft taken on strength and which proved their usefulness, the D.H.80A was reduced to communications work. Most of the aircraft outlived their usefulness during the 1930s, but a few survived as instructional airframes during the Second World War. The last one was on charge until 8 February 1944.

![Royal Canadian Air Force (RCAF) D.H.80A, registration 171, operating on skis. (Museum photo 6124).](image)

**Wing Problems.** During 1930, three mid-flight breakups occurred. The first, VH-UPC crashed in Western Australia. Second was ZS-ACC, which crashed in the Drakensberg Mountains, South Africa, third was an unexplained breakup of *Puss Moth* ZS-ACD which occurred on a flight to Capetown, South Africa, without survivors. This was the third in-flight breakup reported during the previous year with no indication of structural failure, but weather was not ideal during each breakup. De Havilland strengthened the wings to forestall any further breakups but problems continued. It was not until a wing separation occurred at Ottawa with a survivor, F/O Arthur James, RCAF, that offered the best indication of what caused the other crashes. A series of tests were conducted by the Royal Aircraft Establishment (RAE) and further structural changes were made to the wings and a strengthening of the cabin and roof bracing. This finally corrected the problem.

**Long Distance Flights.** The *Puss Moth* became famous as a long distance record breaker aircraft with several important flights during the period of 1930-31 including a Canadian assembled and registered *Puss Moth*, CF-APK, piloted by an Australian, Bert Hinkler. He completed flights from New York to Jamaica to Venezuela and a 22 hour flight across the South Atlantic then to England in 1931. This was the first Canadian registered aircraft to land at many of these countries. Miss Peggy Salaman flew from
London to Capetown, South Africa, beating the previous record by one day, in late 1931. Perhaps the most famous of these record breaking flights was the east-west crossing of the Atlantic from Ireland to New Brunswick by Jim Mollison in Puss Moth G-ABXY "The Heart's Content". His wife, Amy Johnson, broke a record for the fourth time in the solo flight from London to Capetown using G-ACAB in 1932, breaking the previous record set by her husband. In 1933, Jim Mollison also made a first flight from east to west across the South Atlantic leaving from Lympne UK to Natal, Brazil.

**Technical Information**

- **Wing Span:** 11.2 m (36 ft 9 in)
- **Length:** 7.62 m (25 ft)
- **Height:** 2.08 m (6 ft 10 in)
- **Weight Empty:** 574 kg (1,265 lb)
- **Weight Gross:** 930 kg (2,050 lb)
- **Cruising Speed:** 169 km/h (105 mph)
- **Max Speed:** 206 km/h (128 mph)
- **Rate of Climb:** 196 m (650 ft) /min
- **Service Ceiling:** 5,180 m (17,000 ft)
- **Range:** 692 km (430 mi)
- **Power Plant:** one de Havilland D.H. Gipsy III, 120 hp inverted in-line, 4 cylinder engine

**History of Museum Aircraft.** Manufactured by de Havilland at Stag Lane in 1931 and purchased for the U.S. Naval Attache in London with USN designation as XDH-80, serial No.8877. In 1939, impressed into RAF service, 24 Squadron with registration HM534. Released to civilian service in 1946 and finally owned by Mr. Norman Jones of the Tiger Club with registration G-AHLO. The engine was changed to a Gipsy Major in 1950. Purchased by Father John MacGillivary, Roman Catholic Padre at Canadian Forces Base (CFB) Summerside, Prince Edward Island (PEI), in 1969. Arriving by ship at Dalhousie, New Brunswick (NB). the aircraft was reassembled, test flown by Omer Valley for the Certificate of Airworthiness (C of A) and ferried to CFB Shearwater, Nova Scotia (NS). The Canadian registration requested by MacGillivary was CF-PEI and kindly agreed to by Ministry of Transport (MOT). This had been borne by a Puss Moth owned by Mrs. Louise Jenkins of Charlottetown, PEI. She was one of the pioneer Canadian lady pilots in the early 1930s, and her aircraft was well known in the Maritimes in its distinctive red livery. MacGillivary also repainted the aircraft to match that of the original CF-PEI, ie: red, black and silver. The Reverend hangared the aircraft at CFB Shearwater, Nova Scotia (NS) and CFB Summerside, NB while he transferred to CFB Ottawa South as Base Chaplain. CF-PEI was purchased by the National Aeronautical
Collection (NAM) (now the Canada Aviation and Space Museum) in 1976. Flown to Ottawa International Airport by Mr. George Neal, a respected test pilot with de Havilland Canada, it was arranged for Mrs. Jenkins to fly with Father MacGillivray as a passenger from Ottawa International to Rockcliffe Airport for the official handover to NAM. This was a fitting end to the career of this venerable aircraft and Mrs. Jenkins was pleased to fly once again in a CF-PEI.

**Conclusion.** The D.H.80A *Puss Moth* design was welcomed by the civilian pilots who were pleased with the comfort of the enclosed cockpit, particularly those pilots interested in establishing or breaking aeronautical long distance records. During the 1930s, this was a primary goal of many pilots and of course it benefited the de Havilland name and no doubt spurred further sales. Apart from the wing problem, which was eventually solved, the aircraft was relatively trouble free, and a joy to fly. The design and use of the air brake was useful for shorter landing situations. Although the military of the UK did not embrace the *Puss Moth*, it was not primarily designed for the military and any sales in this regard was a bonus.

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