CANADA AVIATION MUSEUM AIRCRAFT

DOUGLAS DC-3 / C-47 / DAKOTA
GOODYEAR RUBBER AND TIRE COMPANY OF CANADA C-FTDJ

Goodyear Rubber and Tire Company of Canada DC3 - C-FTDJ (Canada Aviation Museum Photo)

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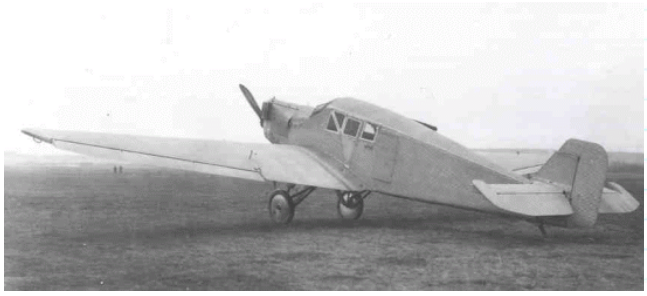
Introduction

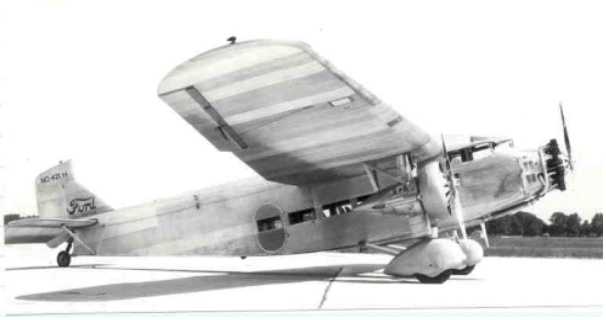
If there was ever a competition to determine which airplane was the true workhorse of the air, the Douglas DC-3 would surely win hands down. This truly remarkable aircraft has been in service for almost seventy years, as a civilian and military carrier, and as a weapon of war, serving in every theatre of operations during the Second World War and in almost every war since that time. The 65th anniversary of the first flight of the DC-3 was on 17 December 2000. DC-3 is the abbreviation for its true title, Douglas Commercial No. 3. Many are still flying in Canada, the United States and other parts of the world, still performing useful service. To better understand the development of the DC-3, one should examine its predecessors.

Development

Early Airliner. Junkers Flugzeug und Motorenwerke AG of Germany designed and built the first all-metal, cantilever, passenger aircraft in 1919. This aircraft, the Junkers F-13, was very successful and evolved into the W-33 and the W-34, an example of which is displayed as an exhibit at the Canada Aviation Museum as CF-ATF. A later model, the tri-motor Ju 52/3m, was widely used by airlines before the Second World War and by the German Luftwaffe during the war. In the United States, the Ford Motor Company designed and built an all metal aircraft, the famous Ford 4-AT TRIMOTOR. The model 4-AT first flew in June 1926. Two hundred and five were built and several remain in limited service today.

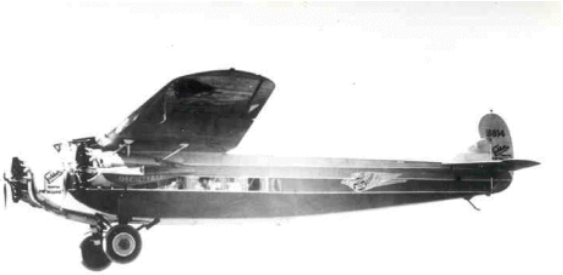


Junkers F-13, first all-metal airplane. (Museum photo)



Ford 4-AT TRIMOTOR, NC 21H, all-metal liner. (Museum photo)

Wooden Aircraft. Several airlines were still using aircraft of all-wood construction; one example was the Fokker F-10 TRIMOTOR. On 31 March 1931, one of these aircraft crashed, killing all on board. The cause was determined to be the wooden wing spar, which failed while flying in turbulent air. As a result of this accident, the United States Bureau of Air Commerce issued a directive for the frequent inspection of the wing spar on all aircraft of wood construction, a very expensive procedure. This, plus the adverse publicity following this accident, reduced public confidence in aircraft of wood construction, creating a strong incentive to design and build all-metal, stressed skin, multi-engined aircraft.



Fokker F-10 TRIMOTOR, wood-winged air liner. (Museum photo)

Metal Aircraft. The Boeing Airplane Company responded with a low-wing, all metal structure, with a smooth duralumin skin and a retractable undercarriage. This aircraft, designated Model 247, was developed from Boeing's earlier Model 200 MONOMAIL and from Models 214, 215 and the B-9 bomber. The new model, powered by two 550 hp Pratt and Whitney WASP engines, had seats for ten passengers and a crew of three. The design was so promising that 59 orders were placed during the mock-up stage of development. It was considered to be the first "modern" airliner and 75 were produced. One example, a 247D serial number CF-JRQ, is currently on display at the Canada Aviation Museum.

Boeing 247D, ten-passenger air liner. (Museum photo)

Trancontinental and Western Airline (TWA) tried to buy 247Ds but, because of the large number of previous orders, Boeing was unable to oblige. Therefore, TWA decided to issue its own specifications for a new all-metal airliner. These specifications were very demanding for the time. The aircraft had to be equipped with three 550 hp engines and carry twelve passengers over stage lengths of 1,080 miles (1,740 km) at 150 mph (240 km/h). In addition, it had to be capable of climbing safely, after take-off with a full load, on one engine from any TWA airport.

Douglas DC-3 Evolution

The Douglas DC-1 & DC-2. The Douglas Aircraft Company designed a twin-engine aircraft that would exceed TWA's specifications and be superior to the Boeing 247D. The result was an all-metal, low-wing monoplane, with retractable undercarriage, powered by two 690 hp Wright SCR-1820-F CYCLONE engines. It first flew on 1 July 1933 as the Douglas Commercial No. 1 (DC-1). After a few modifications, this aircraft flew from Los Angeles, California to Newark, New Jersey in 13 hours and 4 minutes. Only one of this model was built. The sole DC-1 was subsequently modified by upgrading the engines to 710 hp Wright CYCLONEs and it was given a modest fuselage extension, allowing seating for 14 passengers. The modified aircraft was designated the DC-2 and TWA added 20 production models to its fleet, the first of which flew in May 1934. The DC-2 was a great success and was ordered by American Airlines, Eastern Airlines, TWA and Pan American Airlines in the United States. About 200 were built and many served in the military during the Second World War and continued to serve in civilian roles following the war.

Pan American Airlines Douglas DC-2, 14-passenger airliner. (Museum photo)

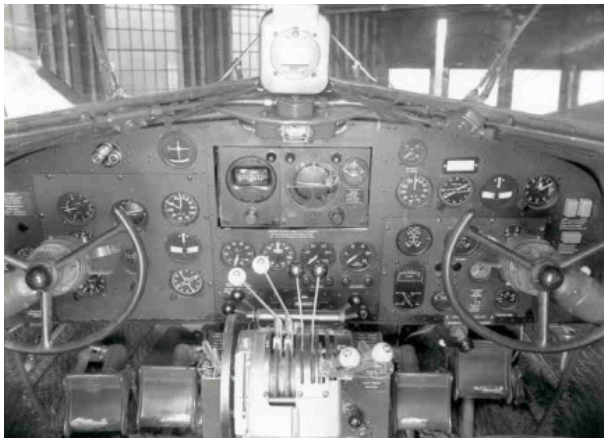
American Airlines operated the DC-2 mainly in the Eastern areas of the country. Their transcontinental route ran south through Dallas, Texas, farther and longer than their competitors. In keeping with railway practice, they provided "Pullman style" sleeping accommodation aboard their Curtiss CONDOR 2 aircraft, which were obsolescent when first flown in 1933. American Airlines wanted a new aircraft, but wanted to retain the "sleeper" option. Neither the Boeing 247D nor the Douglas DC-2 could be modified to this use.

The Douglas DC-3 Emergence. American Airlines approached Donald Douglas with their problem. The Douglas design team quickly realized that this would require a completely new design. However, since they were fully occupied with DC-2 production and were of the view that American Airlines could not pay the costs associated with the development of a new aircraft, they were not enthusiastic. Further, Douglas felt that orders for a specialized type would be small and would not cover the development costs.

Because of this, American Airlines engineers did much of the design and structural change calculations. C.R. Smith, president of American Airlines, assured Douglas that he could obtain a government loan and that the new aircraft could fly both as a day liner and as a "sleeper". Smith also agreed to buy 20 aircraft of which 10 would be "sleepers". It was hoped that the new aircraft would have 25% commonality of parts with the DC-2. However, in the final design there was only a 10% commonality. In reality, the Douglas Sleeper Transport (DST) DC-3 was a completely new aircraft, introducing to aviation such innovations as an auto-pilot and de-icing equipment.

The first DST was fitted with two Wright SLR-1820-G2 CYCLONE engines, each providing 1,000 hp for take-off. After the first flight on 17 December 1935, the test-flying program began in earnest and by the end of December, twenty-six hours had been flown. Performance and handling were as expected, except for excessive take-off distance and adverse directional stability on approach to landing. The former was corrected by engine modifications, giving higher horsepower, and the latter by adding a small dorsal fin. An Approved Type Certificate, ATC No. 607, was issued on 21 May 1936 and the DC-3 was born.

Douglas DC-3 Mk III - 12937 in Air Transport Command colours. (Museum photo)



Cockpit and flight controls of the DC-3 (Museum photo)

United Airlines (UAL) requested modifications to their DC-3s, the main one to replace the Wright CYCLONE engines. The new version, designated DC-3A, used 14-cylinder Pratt and Whitney R-1830 engines, fitted with the Hamilton-Standard full-feathering, constant-speed propellers. These engines provided 1,200 hp at take-off and 1,050 hp at 7,500 feet (2,290 m). After 1942, all DAKOTA, C-47 and DC-3 aircraft were fitted with the Pratt and Whitney engines.

The DC-3 was the first airliner that could operate at a profit and, therefore, was received with enthusiasm. Orders were placed by most U.S. airlines and overseas orders were received from airlines in Holland, Switzerland, the Soviet Union, China, France, Japan and others. In total 609 aircraft were ordered, but 149 of these were requisitioned for use by the U.S. military while still in the factory.

The Military DC-3

In early 1934, President Roosevelt cancelled all civilian airmail contracts and assigned the task to the United States Army Air Corps (USAAC), a move which, sadly, ended in disaster and a number of fatal accidents. This unfortunate experiment clearly demonstrated the inadequacy of the U.S. military air transport capability. Most of the funding to the USAAC was being spent on bombers, fighters, and on observation and training aircraft. Responsibility for the air mail was soon returned to the civilian airlines.

An investigation board was set up by the War Department to study the transport needs of the USAAC and the relationship with the civil airlines. This study recognized that in any future war there would be a critical requirement to move men and materials into the theatre of operations and to take casualties out. The senior staff of the USAAC concurred with the board's recommendations, but underlined the need to develop a military transport aircraft capable of carrying heavy military equipment.

The first aircraft tested was a strengthened Fairchild 71 designated the C-8 and C-8A. Neither was adequate and the project was terminated, however interest in further development remained. Specifications were issued for a new cargo aircraft, capable of carrying a payload of 3,000 lbs. (1,360 kg), cruise at a speed of 125 mph (201 km/h) and with a range of 500 miles (805 km). The Douglas Aircraft Company realized that a modified version of their DC-2 would meet or surpass all these requirements and a proposal was made to build twenty aircraft at a unit cost of $ 61,775 dollars, excluding engines. Other companies, Ford, Fokker and Fairchild also entered the competition.

Douglas C-33 & C-39. The modified DC-2 won easily and, after some negotiation regarding funding, the USAAC ordered one aircraft designated the XC-32. This aircraft proved itself during military exercises and Douglas made further modifications resulting from their experience. These included enlarged tail surfaces, re-enforced cabin floor and expanded cargo doors. The new C-33 became the first true military transport built by Douglas and eighteen were ordered in 1937. After a short period of service this aircraft was further modified to combine its fuselage with the DC-3's centre section. The undercarriage and tail wheel were strengthened and more powerful engines were installed to make this the C-39. Thirty-five of these were ordered in 1939. In the early days the Second World War, C-39s were used to transport cargo to Goose Bay, Labrador, to move the Philippine survivors to Australia and to carry out other like missions.

Douglas C-41A, C-47, C-53, C-117. With the success of these DC-2 variants, the USAAC became interested in the DC-3, which exceeded the performance of the DC-2 in all respects. Because of a shortage of funds in 1939, the USAAC bought only one DC-3. It was built as a civilian airliner, but was equipped with military radio and instruments. This aircraft model was designated the C-41A. Specifications were then drawn up for a completely militarized version of the DC-3. The result was the C-47, of which more than 10,000 were built under various names and designations, including SKYTRAIN, C-53, C-117 and DAKOTA. These aircraft played a major role and served in every theatre of operations during the Second World War. Thousands continued to serve in both military and civilian roles after the war.

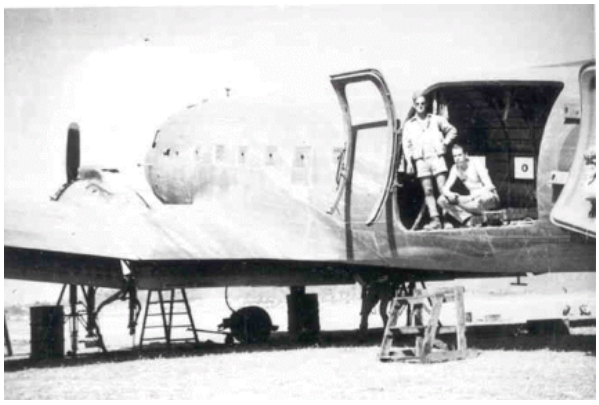
DAKOTAs in the RCAF

The first RCAF DAKOTAs, Mk III models, were Taken On Charge (TOC) in April 1943. Over the next several months, 60 of this mark came into service. In September 1944, the intake of the Mk IV began and 35 of this mark were TOC. The Mk IV had engines fitted with improved superchargers, allowing it to operate at higher altitudes. An example of high altitude operations requiring Mk IVs was the air resupply missions flown "over the hump". This was term used to describe flying over the Himalayan mountain range that lay on the air route to India.

The Tranport Squadrons. The DAKOTA was issued to 164 (T) Squadron formed at Moncton, New Brunswick in January 1943 to provide a transport capability on the East coast of Canada. It was the first RCAF transport squadron. DAKOTAs were also taken-on-strength by 165 (T) Squadron on the West Coast and 168 (HT) Squadron located at RCAF Station ROCKCLIFFE, Ottawa, Ontario. These squadrons were equipped with other types of aircraft also. The only transport squadrons that used the DAKOTA as their primary aircraft were: 435, 436, and 437. Of these, 436 was the first formed in India in August, then 437 in the United Kingdom (U.K.) in September and 435 in India in November 1944.

435 (T) Squadron operated in support of the British Fourteenth Army in northern Burma from airfields at Gujrat, Punjab, and Julihal, Manipur, India. Their first official operation was from Julihal on 20 December 1944, airlifting supplies to a makeshift landing strip at Jarnu in the Kabaw Valley and air supply drops at Pinlebu, east of the Chinluin River. This type of operation continued until the last mission flown in India on 30 August 1945. After this, the Squadron was moved back to the U.K., arriving on 19 September 1945, and based at Dawn Ampney, Glasgow. From here the Squadron flew many missions in support of Canadian units to various points of Europe until disbandment on 1 April 1946.

A C-47 DAKOTA of 436 Squadron in India, typical of the aircraft used by 435 and 437 Squadrons. (Museum photo)



C-47 DAKOTA of 436 Squadron in India, showing the large cargo doors. (Museum photo)

436 (T) Squadron, formed earlier also at Gujrat, Punjab India, carried out the same role as 435 (T) Squadron, the support of the British Fourteenth Army in Burma. However, their first official operation occurred later on the 15 January 1945 when seven DAKOTAs from Kanga airlifted 59 tons of supplies to No. 33 Corps at Shevebo; 17.5 tons were para dropped, 3.7 tons were free dropped and 37.8 tons delivered to airstrips. These operations were continued in Burma until August 1945. The Squadron then flew to the U.K., where several missions to Europe were carried out before disbandment at Odiham, Hampshire on 22 June 1946.

437 (T) Squadron was formed at Blake Hill Farm, Wilts, England on 14 September 1944. Its first mission occurred only three days later on 17 September 1944 when fifteen DAKOTAs participated in operation "Market Garden", the airborne assault on Arnhem in Holland. Twelve HORSA gliders, containing men and equipment of the British First Airborne Division, were towed and released over the combat area. Operations, including the Rhine River crossing, continued until 30 May 1946. The squadron was disbanded at Odiham on 15 June of that year.

Post-War RCAF use of the DC-3 DAKOTA

435 (T) Squadron was reformed at Edmonton, Alberta on 1 August 1946 and was equipped with DAKOTA Mk. 4 aircraft. These continued in service until October 1960. In September 1952 the Squadron began replacing the DAKOTA with the Fairchild C-119 FLYING BOXCAR. Other squadrons and units were partly equipped with DAKOTAs. These included two photo squadrons based at RCAF Station ROCKCLIFFE -- 408 (P) Squadron and 414 (P) Squadron; 412 (T) Squadron and 413 (Survey & Transport) Squadron were also located at Station ROCKCLIFFE; and 426 (T) Squadron at Dartmouth, Nova Scotia and later at Dorval, Quebec. In addition there were several smaller Communications and Rescue Units, and the Air Navigation School that used the DAKOTA.The peak strength of DAKOTA aircraft in RCAF service as of 1968 was 169 of all Marks. The last was Struck Off Charge (SOC) in September 1990.

Physical Description DC-3/C-47 DAKOTA

Airframe. The airframe is constructed of all metal stressed skin and semi-monocoque construction. This construction technique allows the skin to carry most of the stress loads occurring during flight. The aircraft features a low wing of cantilever design fitted with de-icing boots located on the leading edges of the wings and tail plane. The cargo compartment of the DAKOTA is accessed through large opening doors that permit loading of large pieces of equipment such as spare engines, field guns, jeeps etc.

Wing Span:	95 ft (29 m)
Length:	64 ft 5 1/2 in (20 m)
Height:	17 ft (5.2 m)
Weight Empty:	18,500 lbs (8,390 kg)
Cabin Payload:	Up to 6,000 lbs (2,720 kg)
Max Take-Off Weight:	29,000 lbs (13,150 kg)
Max Overload:	31,000 lbs (14,060 kg)
Fuel Capacity (Normal):	670 Imp Gals (3,046 L)
Oil Capacity:	48 Imp Gals (218 L)

Fuel Tanks. Four fuel tanks are located within the wing center-section. Two main, forward tanks hold 168 Imp Gals (764 L), and two auxiliary aft tanks hold 167 Imp Gals (759 L). An additional 80 Imp Gal (364 L) long range tank can be installed in the main cargo compartment as required for extended range.

Engine Summary. The DAKOTA Mk III and IV aircraft, as used by the RCAF and many other air forces, were multi-purpose transport airplanes powered by two models of Pratt and Whitney engines. The Mk III used the R-1830-92, a 14-cylinder, air-cooled, radial engine, giving 1,200 hp at take-off and 1,050 hp at 7,500 feet (2,290 m) altitude. These engines incorporated a single stage supercharger. The Mk IV used the R-1830-90C fitted with a two-speed supercharger to give 1,200 hp at take-off and 1,000 hp at 14,500 feet (4,420 m). This latter supercharged engine was required to fly over high mountainous areas such as the “hump” in India. The early DC-3s, DSTs and C2s, of which there were about 270, were powered by various models of the nine-cylinder Wright LR-1820 CYCLONE engine. The most powerful of these was the C202A rated at 1,200 hp for take-off and 1,000 hp at 4,500 feet (1,370m).

Flight Characteristics of the DC-3/C-47, DAKOTA

Normal Operations

Take-Off. The DAKOTA can take-off at maximum gross weight of 29,000 lbs (13,150 kg) in very short distances from very rough air strips. For example, using one quarter flaps and maximum allowable power, (48 inches of mercury and 2700 rpm)[1] the aircraft can be pulled-off a sod-turfed strip at 80 mph (129 km/h) Indicated Air Speed (I.A.S.) in about 850 feet (260 m) or 1,550 feet (470 m) to clear a 50-foot (15 m) obstacle. This performance assumes a 20 mph (32 km/h) headwind. The aircraft has little tendency to "swing" on take-off except perhaps in a cross-wind, in which case the aircraft had a tendency to "weather-cock" into the wind. This is easily corrected by slowly operating the throttles differentially, heavy use of rudder and by keeping the tail-wheel on the ground longer than usual.

Climb and Cruise Procedures. When safely airborne, the undercarriage is raised while keeping the nose at minimum climb angle in order to attain the critical single-engine safety speed of 105 mph (169 km/h). Should engine failure occur at this point, the aircraft can still climb slowly provided the landing gear and flaps are retracted and the propeller of the "dead" engine is fully feathered. In a normal take-off, the flaps are retracted at 500 ft (150 m) altitude above ground level. The recommended climb speed is 120 mph (193 km/h), requiring engine settings of 41 inches of mercury and 2,550 rpm in auto-rich mixture. On reaching cruising altitude, power is reduced to 29 inches of mercury and 2,250 rpm. In auto-lean mixture, about 180 mph (290 km/h) IAS can be maintained at 29,000 lb (13,150 kg) weight. With one long range-fuel tank of 80 Imp Gals (364 L) installed in the cargo compartment, the aircraft can remain airborne for about fourteen hours.

In Flight Characteristics. The aircraft is stable about all axes under all conditions of flight. The rudder is moderately heavy at all speeds, but very effective. The ailerons are light and effective but tend to be a bit spongy. The elevators are moderately light and effective at all speeds.

Stalls. When doing an intentional stall, it is essential to climb to a safe altitude and slowly reduce power while holding the nose slightly above the horizon. As the airspeed decays, there is little warning of the approach to stall except for a slight buffeting of the tail about 5 mph (8 km/h) before the actual stall. This occurs at 77 mph (124 km/h) with a light, all-up weight of 24,000 lb (10,886 kg) and with the landing gear and flaps in the up position. With the gear and flaps down, the stall speed is 67 mph (108 km/h).

At the stall, the nose of the aircraft will drop gently and power must be applied to fly out of the stall and attain normal cruising speed. With power "on" and gear and flaps down, the aircraft will tend to roll to the left and immediate corrective action must be taken to avoid entering a secondary stall. Stalling speed increases with increased angle of bank (over 100 mph [161 km/h] in a 45 degree bank turn). In a turn of this nature, the lower wing will stall and the aircraft will roll in that direction. Intentional spinning of the DAKOTA is, of course, prohibited. Should a spin develop, recovery is normal, but care must be taken not to overstress the aircraft on pull-out. Loss of altitude will vary from 500 to 1,500 feet (150 m to 460 m), depending on the flight conditions at the stall.

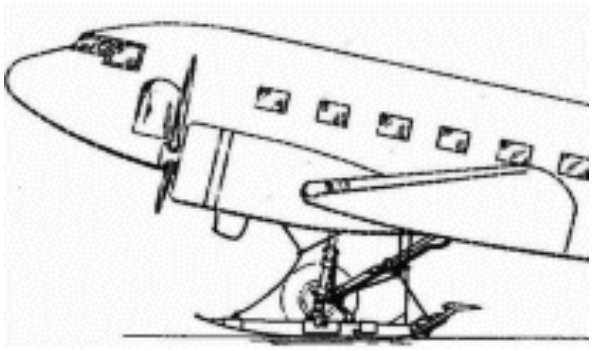
Single Engine Operations. With one engine shut down and the propellor fully feathered, the aircraft can be trimmed to fly almost hands-off at 110 to 115 mph (177 to 185 km/h). Good flying technique requires that all turns be made toward the operating engine and to land at the nearest airport. The circuit is kept as close to the airport as practical and altitude is conserved in case the other engine should fail. Only when certain of reaching the runway should the undercarriage be lowered and a gradual application of flaps begun. The aircraft is re-trimmed as power is gradually reduced and a normal landing performed. No attempt should be made to overshoot nor should any attempt be made to taxi the aircraft on one engine.

Approaches and Landings. Landing the DAKOTA is relatively straight-forward. After joining the landing pattern on the downwind leg, the speed is reduced to 160 mph (257 km/h), the undercarriage is lowered and locked, and the mixture placed in auto-rich. On the base or crosswind leg, flaps are cycled to one quarter down, speed is reduced to 110 mph (177 km/h) and maintained on the turn to final. Final approach speeds, with flaps down and weight of 27,000 lb (12,240 kg), are normally 90 mph (145 km/h) with power "on" and 100 mph (161 km/h) in a glide approach. Landings are normally "wheeled" landings with the tail up and the aircraft in a normal flight attitude. A three point landing, with full flap extended, is difficult but can be used in special circumstances. Three point landings are no problem with flaps retracted.

Cross-wind Landings. In cross-wind landings, the line of approach is maintained by "crabbing" into wind and lowering the "upwind" wing. When over the runway, rudder is applied and ailerons leveled to straighten the aircraft as required. Cross-wind landings require the use of the wheel landing technique. In very strong cross-winds, it is easier if no flap is used. The aircraft can land over 50-foot (15 m) obstacles, such as trees, onto a runway of firm dry sod with a 2,800 ft (850 m) landing roll. This is reduced to 2,600 ft (790 m) on a tarmac runway. In wet slippery conditions with poor braking, this roll-out can rise to as much as 5,100 ft (1,554 m). If there is a need to overshoot, the throttles are "opened" to 41 inches of mercury, 2,250 rpm and the aircraft will climb-out without difficulty. The undercarriage is raised and, at 200 feet (60 m), and the flaps are raised in stages until fully retracted.

Ski Operations. The DAKOTA could be fitted with retractable wheel-skis which incorporated a small airfoil at the trailing edge. The aircraft takes considerably longer to take-off from a frozen lake in this configuration because of the increased drag. As a rule it was a very rough ride and might require JATO to assist in clearing obstacles! JATO or jet-assisted take-off, used a solid fuel rocket to propel the aircraft forward and upward on take-off from a confined area or when carrying an excessive load. When airborne, it is important to reach the single-engine safety speed of 105 mph (169 km/h) before raising the skis. At this speed, the small airfoils at the rear of the skis produced sufficient lift to level the skis and allow them to be to be raised into position under the engine nacelles. If the skis are retracted too soon, there is a real danger of damaging oil cables located under the engine cowling, causing leaks with disastrous results.

DC-3 on skis, taking off from a frozen lake with JATO. (Museum photo)



DC-3 on skis. Note airfoil at trailing edge of ski. This will keep the ski level after take-off to allow safe retraction. (Photo Technical Orders)

Glider Towing Operations. A longer take-off run is required when towing a military glider loaded with troops, guns, and/or vehicles. The maximum glider speed is 105 mph (169 km/h). In the event of an engine failure on take-off with a glider attached, there is no recourse but to release the glider. Formation flying with gliders in tow is difficult because of the reduced maneuverability caused by the excess weight and slow speed.

Canada Aviation Museum Exhibit Goodyear Tire and Rubber Company of Canada - DC-3 C-FTDJ

The Canada Aviation Museum has one example of the DC-3, a civilian version. The Museum's aircraft was one of the aircraft built by Douglas at their Santa Monica, California plant in early 1942. It was built as a DC-3 454, powered by Wright CYCLONE engines, for the Netherlands East Indies Air Force. Instead, it was impressed into the United States Army Air Forces (USAAF) as a troop transport. It was operated mainly in the U.S. as a C49J-DO serial No. 43-1985 until withdrawn from service 24 April 1945. On 21 May 1945, the aircraft was purchased from the U.S. War Assets Corporation by Trans-Canada Air Lines (TCA). After conversion by Canadair Ltd. to a 21-passenger version, it became TCA's first DC-3. It was used primarily on the Montreal to New York City route with registration CF-TDJ.

In November 1948, TCA sold the aircraft to the Goodyear Tire and Rubber Company of Canada. Goodyear contracted Canadair Ltd. to convert CF-TDJ to an executive transport, replacing the Wright CYCLONE engines with the more powerful Pratt and Whitney R-1830s. The Company used the aircraft for the next thirty-five years, from November 1948 until December 1983 under its revised registration, C-FTDJ. It was donated to the Canada Aviation Museum in 1983 and was flown from Toronto to Rockcliffe Airport, Ottawa for the presentation ceremony.

Concluding Remarks

During its long career the DC-3/ C-47/DAKOTA was used in a wide variety of roles; airlines, military transport, search and rescue, electronic warfare, glider training, geological survey, aerial photography, navigation trainer, crop dusting, ground attack, to mention a few. As earlier noted, the Douglas Aircraft Company built 10,655 of these ubiquitous aircraft, the Soviet Union built 2,930 as the Li-2, and Japan built 487 as the L2D. It is estimated that 400 of these remarkable aircraft were still in service in the year 2000. Some DC-3s were re-engined with turbo-prop engines, such as the Armstrong-Siddely Mamba, the Rolls Royce Dart and the Pratt and Whiney PT-6-65A. The second DC-3 built was delivered in July 1936 and by July 1950 it had worn out 50 pairs of engines! Possibly this is one of the 400 still flying. Sixty-five years old and still going strong.

Footnotes

1. *"Inches of Mercury" is a measure of manifold pressure, indicating the pressure of air being fed to the carburetor. Pressure can be increased or boosted by a supercharger. This is essential for flying at higher altitudes in more rarified atmospheres to achieve maximum combustion and to maintain power.*

Trans-Canada Airlines DC-3 CF-TDJ in its airline days before becoming an executive plane for Goodyear. (Museum photo)

The Goodyear executive DC-3. (Museum photo)

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