The NStar Chronicle

Project **N**orth **S**tar **A**ssociation of **C**anada June 2007

Merlin Musings

Third in a series

Ted Devey

Following the Battle of Britain in 1940, when Prime Minister of Britain, Winston Churchill said, "Never in the field of human conflict was so much owed by so many to so few", he was doubtless referring to the RAF and other pilots flying Supermarine Spitfires and Hawker Hurricanes who shot down so many German bombers and Messerschmitt fighters that Hitler decided to postpone the invasion of Britain. This allowed the Allies time to build up invasion forces which finally ended World War ll.

"The few" had the support of superb airframes powered by superb Rolls-Royce engines produced by superb aircraft industries. With the aid of early warning radar these few were waiting for their prey as they crossed the English Channel.

Rolls-Royce had long established a tradition of naming their in-line liquid-cooled piston engines after birds of prey, e.g. 'Hawk', 'Eagle', 'Kestrel' etc. The Merlin is a small bird of the Falcon family.

The Merlin engine was developed in the early 1930s as a replacement for the Kestrel which had been developed close to its potential. Henry Royce was knighted in 1931 for his work on aircraft engines. He died in 1933, by which time he had laid down the basis for a new engine, the PV-12 (PV for Private Venture), which was later named the Merlin. The Merlin started off as a continuation of the Rolls-Royce 'R' engine of Schneider Trophy fame. The immortal Merlin was to make a major contribution to the Allied offensive in World War ll leading to victory over Germany in 1945.

The Merlin is a V-12 liquid-cooled piston engine having 4 valves per cylinder (2 intake and 2 exhaust) actuated by a single camshaft in each cylinder head, exhausts being sodium cooled. Early Merlins had single-speed single-stage superchargers. (A distinction is made here between a super charger - the blower directly driven by the crankshaft, and a turbocharger - the blower driven by a turbine in the exhaust system.) Rolls-Royce piston engines employed superchargers geared to the crankshaft with rotational speed directly proportional to the crankshaft. Early Merlins were rated at 790 horsepower at 3000 RPM. Production engines were liquid cooled using a mix of ethylene glycol and water.

This arrangement did not work well with the 4 valves in the Merlin cylinder heads, especially with higher specific power delivered by the Merlin. Coolant leaked at the joint of the cylinder head and cylinder liners. There were many other development problems for the Merlin and in the mid to late 1930s the Merlin seemed not to be destined to be a successful engine.

With the clouds of war becoming ominous by the mid '30s, the British Government was relying on the Merlin for fighter planes. The ramp-head was changed for the Kestrel-style cylindrical combustion chamber which eased detonation and exhaust port problems but the leak at the liner/head joint continued. This was finally resolved when a detachable

Contents of this volume:

Merlin Musings 1
Interview – Gerry Reed 3
The PNS Office 7
Miscellany 10

cylinder head was developed.

The power rating was increased to 1,030 hp at 16,000 feet using 87 octane fuel. Further development, using 100 octane fuel, was carried out but fuel of this quality was only available in small quantities. Just before the Battle of Britain a tanker load of 100 octane fuel arrived from the United States which had slipped past the U-boat menace of the North Atlantic Ocean. This fuel allowed manifold pressure to be increased and to raise the power rating from 1,030 to 1,160 hp. In mid-1940, a further increase of manifold pressure yielded power up to 1,300 hp which was vital factor in the Battle of Britain.

The Royal Aircraft Establishment worked on improving supercharger performance. The Merlin XX powering Hurricanes and the Merlin 45 for Spitfires used redesigned superchargers which produced dramatic performance improvements at all altitudes.

The requirement for high altitude performance resulted in a two-stage (2 blowers in tandem) two-speed engine which was used in many aircraft. To accommodate the second supercharger stage a space increase of eight inches forward of the firewall was needed. Because of the higher charge temperature from increased levels of supercharging, an intercooler (between the first and second stages) and an aftercooler (between supercharger output and the induction pipe) were added requiring its own coolant pump and radiator. Therefore, there were three cooling systems, main, inter/after, and lubricating oil. As lube oil was sprayed around the crankcase area and piston bottoms, large amounts of heat were removed by the oil circulating through the engine.

Lubricating oil in earlier engines was fed to the main bearings in the crankcase and via a groove in the bearings to the journals of the crankshaft. Starting with the 100 series, two-stage Merlins used an end-to-end lubricating system in which oil under pressure was fed into the crankshaft from both ends. Thus, the crankshaft itself was employed in distributing oil to the main and journal bearings and to the wristpins attaching pistons to their connecting rods. Sludge traps were incorporated in the crank journals. This required engine disassembly to remove the crankshaft in order to access the removable journal-crank plates to clear out the sludge.

The Merlin at this stage of development was able to attain a power output of 2,200 bhp when burning 115/150 grade fuel. However, Merlin 622s fitted to the North Star were rated at about 1700 continuous horsepower. Through unrelenting determination and very clever engineering Rolls-Royce overcame many very difficult problems in the Merlin development. The impossible just took a wee bit longer!

Manufacturing Merlins

At first, Merlins were built at the Rolls-Royce plant at Derby, England. But, as the pace of World War II quickened, the demand for Merlins by airframe industries increased well beyond the ability of Rolls-Royce to supply. Ford Motor Company of England was approached to build Merlins under license. A new plant was built by Ford at Trefford Park near Manchester. Ford-built Merlins were single-stage two-speed 20 series engines mainly for bombers. Ford built about 30,400 Merlins in a period of 5 years.

Henry Ford of Detroit was approached to manufacture Merlins but negotiations fell through. However, Packard Car Company of Detroit agreed to manufacture Merlins. The RAF was in dire need of Merlins for ongoing production of Spitfires and Hurricanes as well as aircraft of the fighter-bomber type, e.g. Mosquitoes, and heavy bombers such as Lancasters and many Halifaxes, each with 4 engines.

Packard supplied Merlins to Britain for British-built aircraft and to North American Aviation for their production of P-51 Mustang fighters which, when equipped with Merlins, became the outstanding long-range high-altitude fighter of WWll. Packard also supplied Merlins to Canadian manufacturers for Lancaster bombers, Mosquitoes, and Hurricane fighters. (Of interest, Michael Potter of Vintage Wings of Canada has acquired a Canadian built Hurricane which is being restored to flying condition by volunteers in his hangar in Gatineau).

Construction of the Merlin

The Merlin is a V-12 engine with 60 degrees between each bank of 6 cylinders. Four-stroke engines fire each cylinder every 720 degrees of rotation. 720 degrees divided by 12 is 60 degrees for even firing. The crankshaft has 7 main bearings and 6 crank throws. Each crank-throw handles 2 pistons. Automobile practice often uses side-by-side connecting rods sharing the full journal width on each throw. The Merlin uses a system of a fork and a blade rod for 2 pistons, one in each cylinder bank. The fork rod has a bearing surface the full width of the associated crank pin. The blade rod fits in between the forks of its mating rod and bears on the outside of the 'fork' bearing so that when the piston fires, the full force is applied to the crank through the 'fork' bearing onto the full width of the crank journal. Thus, very high power ratings are available on each crank bearing surface from both pistons firing alternately. The bearing surface of the fork rod experiences continuous rotation of the crank surface while the blade rod bearing experiences an oscillatory to-and-fro motion on the outside of the fork rod.

The upper crankcase contains the 7 main bearings for the crankshaft. There are two power outputs, the major power being delivered to the propeller through 2 1/2 to 1 reduction gearing at the front and to auxiliaries at the back end. Auxiliaries are fed through the wheel case which supplies drives to the supercharger, two vertical camshaft drives, two magnetos, fuel, coolant and lube oil pumps, generator, and accepts input from the starter motor to turn the crankshaft.

Each cylinder bank is fastened to the upper crankcase by 14 long bolts with nuts bearing on the cylinder head and the cylinder head is bolted additionally to the top of the cylinder bank. Castings are aluminum alloy. The cylinder liners are special grade of steel and are held in place by the cylinder head fastenings. The cylinder heads each contain a single camshaft with four cams for each cylinder; two for the intake valves and two for the exhaust valves.

Most Merlins were carbureted which was satisfactory for bombers but presented problems for fighters which flew in various attitudes. (Messerschmitts of the Luftwaffe were fuel injected and could, therefore, fly upside down).

The Merlin 622s of the North Stars were fuel-injected. A fuel induction pipe was fed a fuel mixture from the supercharger and thence was distributed by the intake manifolds to the cylinder intakes. The manifolds were fitted with flame arresters to prevent backfiring into the explosive fuel mixture in the induction system. The exhaust pipes were very short leading directly into the great outdoors and so Merlins were notoriously noisy. TCA North Stars and BOAC Argonaut airliners were eventually fitted with cross-over pipes to direct exhausts away from the fuselage. Many aircrew who flew in North Stars experienced noise induced hearing loss and some eventually required hearing aids.

Chapter 4 of Merlin Musings will cover the wide range of aircraft that were powered by the universally applied Merlin series of aero engines.

PNSAC

Interview – Gerry Reed

Gerry Reed's career in aviation spanned 37 years service as an Aero Engine Mechanic (AEM), Crewman and Flight Engineer. He was born in North Bay, Ontario, but moved with his family to a farm in Songis where he received his formal education in a one room school. He joined the RCAF in 1943 after working briefly for several aviation companies in Montreal. His service career started in MacDonald, Manitoba, at #3 Bombing and Gunnery School, followed by postings to Uplands, Rockcliffe, St Hubert, Winnipeg, and 426 Transport Squadron at Dorval and McChord Air Force Base, Tacoma, Washington. Gerry retired from the RCAF in 1966, obtained his Flight Engineers and AME licenses and took employment with Ottawa Aero Services, and, with the Ministry of Transport VIP Flight at Uplands. On retirement in 1979 he had logged a total of 6254 flying hours, 5709 of these on North Star aircraft.

Figure 1: Enroute to Tokyo, autumn 1950. Left to right: Gordon Webb(Captain), Gerry Reed(Flight Engineer), Paul Lemieux(Co-pilot). Timmins collection

You were born in North Bay in 1924, raised on a farm, and joined the RCAF in Montreal in 1943. What are your recollections of important events in your life such as education and employment, over this time period?

I started school at age six, in Phelps School, a one room school where the teacher taught all eight grades. It had oil lamps on the walls, two gas lamps hung from the ceiling and had a woodstove for heating. My first teacher was Mr. Ball. He was a good

teacher but he used a pointer to hit you across the knuckles; it really smarted. I found it difficult to study with eight grades in one room and left school in 1938 to work for a farmer. Then I worked for a contractor building the King Edward Hotel in Sudbury. I obtained my Drivers License in 1940 and moved to Montreal where I was hired by Fairchild Aircraft as an Assistant Materials Inspector. We tested many types of wood, fabric, wire, steel, aluminum and various sheet metals. In 1941 I left Fairchild Aircraft and worked for Dominion Engineering as a tool maker apprentice in the tool room making taps, dies, drill bits, reamers, gears for lathes, gauges, etc. I enlisted in the RCAF on June 12, 1943.

Outline your training and assignments prior to joining 426 Squadron in Dorval.

After I enlisted I was told to report to #5 Manning Depot at Lachine, Quebec, on August 23, 1943. I was given a medical examination and after ten days basic training, I was posted to #3 Bombing and Gunnery School at MacDonald Manitoba. I was trained as an Aero Engine Mechanic and worked on Fairey Battle, Bolingbroke, Lysander, Norseman, Oxford, Anson and Hurricane aircraft. In 1945 I was posted to #1 Air Supply Unit at Uplands, Ontario, where we winterized Dakota and Norseman Aircraft for Operation Musk Ox. This was an Arctic operation in 1946 to test aircraft and motor vehicles in cold weather. It started at Uplands, moved to Churchill, Manitoba, then to Cambridge Bay, and finally across the Arctic to Fort Nelson, British Columbia.

I trained as a Crewman on Dakota aircraft at #1ASU. This training was done in maintenance at #1 ASU, where I was given instruction by each trade (technician) and when completed, I was authorized to sign off for Daily Inspections by all trades on the aircraft. I was posted to #168 Heavy Transport Squadron at Rockcliffe and worked on B-24's, B-17's and Dakota aircraft, then to #124 Ferry Squadron at St. Huberts Quebec. We flew Dakota's into Estevan and Weyburn, Saskatchewan, and Lancasters into Claresholm, Alberta for storage. The Squadron moved to Winnipeg and became #164 Squadron Detachment. On January 2,1947 I was sent to Canadair and Trans Canada Airlines for courses on the North Star aircraft. I returned to Winnipeg to wait for my transfer to 426 Squadron.

You were posted to 426 Squadron as it was being re-equipped with North Star aircraft. What were your first impressions of this new transport aircraft?

I was transferred from 164 Squadron Detachment in Winnipeg on March 26, 1947, to 426 Squadron located at Dorval, Quebec, as an AEM and Crewman. I was very impressed with the new North Star aircraft, it was faster, more powerful and it was easier to handle than the B-17, B-24 and Lancasters. It looked like a real winner.

When were you selected to be a flight engineer on North Stars? How were you prepared for this assignment? Describe in general terms the FE's responsibilities: pre-flight, in flight, and post- flight.

In May of 1947 I was selected for training as a Flight Engineer on the North Star. I received two hours training at Canadair and four hours training at 426 Squadron. I was the third Flight Engineer to be checked out on the North Star.

The purpose of the Flight Engineer's pre-flight checks was to make sure the aircraft is serviceable and ready for flight . I started with a review of the aircraft log (L14) which includes a record of snags and their rectification, required inspections completed and signed off, and the fuel state. Then I would do a walk around, starting at the main entrance door. My routine included checks of the door handle and seals, the left side of the fuselage and windows for scratches and crazing, the main landing gear and doors, the wing flaps for drooping, the underside of the wings for fluid leaks, the ailerons for damage, for missing static wicks, navigation lights for damage, the upper side of the wing, the de-icer boots for condition and security, the engine nacelles for cowling fasteners, the air intakes for bird nests, the aircraft nose, nose wheel well and doors. Then I checked the same items for the right side of the fuselage, followed by a visual inspection of the tail planes, de-icer boots, the elevators, both upper and lower surfaces for damage, the tail fin both sides and de-icer boot. Finally, I drained the fuel sumps and strainers, checked the fluid state by dipping the fuel and oil tanks, making sure all caps and covers were secure.

In flight, I was responsible to the Captain for aircraft airworthiness. I handled the throttles, propellers, landing gear, wing flaps, radiator flaps, booster pumps, fuel management, superchargers, de-icing and anti-icing, heaters, oxygen , landing lights and navigation lights. I monitored all engine instruments and kept an hourly log which remained with the aircraft until it returned to base.

At the conclusion of each flight I made sure all the switches were turned off. I entered all snags in the L-14 and completed another walk around the aircraft, ensuring that the ground locks had been installed. If required, winter fronts were installed.

Flight Engineers were frequently called upon to complete the Daily Inspection (DI) when aircraft were away from base. This inspection, normally completed by technicians at base, was valid for 24 hours. The DI included all the items listed above as part of the pre- fight checks plus: replenish gear box oil and engine oil, coolant systems, hydraulic system, fuel selectors, throttles, propellers, flying controls for freedom of movement and travel, tires for cuts and wear, brakes for wear and signs of overheating. It took me about an hour to do a DI, but this would vary with snags and available facilities.

The North Star engines had special features for cold weather operations. Discuss your personal experience with cold weather ops.

Oil dilution and an APU with a hydraulic pump and generator were the keys to cold weather operations. On the February 16, 1950 I left Dorval with two crews; F/L Don Dickson was our Captain, F/O JB Miller was the Captain of the other crew. We flew to Goose Bay and after landing our second Flight Engineer, "John Robertson" went to install ground locks, he slipped on the ice, fell and broke two ribs. The Captain took him to the Base Hospital where they prepared him for a flight back to Montreal. I refueled the aircraft, we flew to Frobisher Bay, refueled again, then flew to Resolute Bay. We landed on an ice strip in the bay, refueled the aircraft, then oil diluted and parked it for the night. The crews slept in an Arctic Tent. That night F/L Dickson said to me, "I hope to make two trips to Isachsen in the morning, and JB will make two trips in the afternoon.". I replied, " We will need two hours at noon to do a Daily Inspection and to clear some snags." He said "What time would you be ready for the first flight". I said "Wheels up at six!"

This was our first Re-Supply Operation and the USAF was going to show us how they do it. They had seven C-54's and one C-82 at Resolute on the ice, the temperature was -45 F. I got up at 4:00 a.m. and started the APU running, then started the North Star engines and boiled off the oil dilution; this took about one and a half hours. Then I ate breakfast and returned to the aircraft. I noted there was no activity over at the C-54's. We took off right on time to Isachsen, landed on the ice strip, unloaded and we were back in the air in twenty- five minutes and returned to Resolute. We refueled the aircraft and departed with our second load to Isachsen, again we unloaded and returned to Resolute. Still no USAF aircraft running. We refueled the aircraft, fixed a couple of snags and completed a DI in one and a half hours and were able to depart on my third trip with JB and crew to Isachsen. Again we unloaded and returned to Resolute and noted the first C-54 was just airborne. We refueled and left with the fourth load to Isachsen, again we unloaded and returned to Resolute.

To make a long story shorter, it went like this: when I left Dorval I was told we would be away for two weeks. I returned to Dorval 78 days later on the 5th of May 1950. I had flown hundreds of hours on five different aircraft to complete the Re-supply Operation.

You deployed to McChord AFB with 426 Squadron on July 25, 1950 for the Korean Airlift. By the end of the Airlift in 1954 you had completed 37 missions. What are some of the memorable events/incidents you experienced?

On a trip from Shemya to Toyko in 17510, we took off about 4:00 a.m. under minimum weather limits with rain and a crosswind. The Captain called for gear up, I heard a bang and noticed the undercarriage warning light was red and I could hear the air rushing by. This suggested the nose wheel doors were either open or off, and that the nose gear was not fully up. I tried to look at the nose gear using the drift meter but in the dark, cloud and rain I could not see much. The Captain said we will press on and when it becomes daylight we will get a better look at the nose gear. He said our landing forecast in Toyko is good.

Later we were flying between cloud layers in daylight and I was able to use the drift meter to look at the nose wheel. The nose wheel doors were open and the nose wheel was turned about 15 degrees to the left. The steering selector was hanging from its cables. The nose leg had failed to extend and had pushed the saddle on its side and knocked the steering selector off the wheel well wall.

When we were about six hours into the flight the number three engine began running rough. We feathered it and continued our flight to Tokyo. Three hours later we entered freezing rain; ice built up on the feathered propeller and started to pull it out of the feathered position. The Captain decided to go down close to the water to get rid of the ice, and when we had passed the band of freezing rain we climbed back to our flight plan height. By this time we knew we would have to go to our alternate because the head winds were stronger than forecast and we had used extra fuel at the lower level and climbing back to flight plan height.

The First Officer obtained clearance to Misawa. We arrived overhead at 17:15. and the Captain or-

dered every one except the Flight Engineer to go to the main cabin and take a secure position for landing. There was light snow falling, but the visibility was quite good. The Captain called for the landing check, and when completed, he called for 15 degrees of flap, then gear down. The landing gear lights showed three green. The Captain called for 30 degrees of flap and when we touched down the aircraft made a dive to the left. He applied right brake and the nose wheel castered as we rolled to a stop. I got out and installed the ground locks, had a look at the nose wheel, got back on board, and we taxied the aircraft to the maintenance area using differential braking.

The Officer Of The Day came over to us and asked if there was anything we needed. I asked, "Do you have a jack for the nose of a C-54"? He said "Yes and I will have one brought over to your plane". We also needed new seals and O rings and some hardware fittings for the nose wheel doors saddle, and a nose wheel steering selector valve. We got everything except the selector valve. The Captain left to phone for a selector valve.

I placed the jack in position and jacked the nose up six inches above the pavement. I disconnected the nose wheel scissors, installed a bleed cap to release the air in the nose leg, and then removed the air valve and installed a hose fitting to flush the leg later. Next I removed the nose wheel and axle assembly and put it to one side, then removed the gland nut and tried to remove the fork and piston. It was reluctant to move, but we got it out. What a mess it was! Loaded with dirt, the seals had been sliced and were oval- shaped, rolled and twisted and jammed in the lands of the piston. This is why the leg failed to extend. I removed the O rings and cleaned the piston, flushed the leg housing, installed the new seals and reinstalled the fork assembly. I reinstalled the nose wheel and axle assembly, put grease on two drip trays back to back and placed them under the nose wheel. Then lowered the aircraft nose, installed the air valve and serviced the nose oleo leg and connected the leg scissors.

The Captain called 426 Squadron, Canadair, TCA and Douglas Aircraft, only to learn that there had never been a failure of this selector valve, so none were in stock. It was now 2 a.m. and I was more determined than ever to get this fixed. I took the selector to the hydraulic shop and had it tested; it worked very well. While I was in the sheet metal shop I noticed a tradesman making a cage for a navigation light. This is when I decided to make a cage for the nose wheel steering selector valve. I reinstalled the caged selector valve, replaced the broken fittings in the saddle and adjusted the nose wheel steering cables.

We were now ready to try out the steering. It worked fine, so I jacked the nose up again and removed the drip trays. I asked the Captain to select gear up, then to free fall the gear, then a normal gear up, and finally a normal gear down. Everything worked well. We removed the nose jack and I completed the DI and made numerous entries in the L-14. I refueled the aircraft for the flight to Toyko. We taxied out to the end of the runway and were waiting for our clearance when the Control Tower called and said "I believe one of your engines has stopped running". The Captain smiled and said, "That is affirmative, we filed a three engine flight plan". We took off about 13"15 and landed at Haneda.

The next day 17516 arrived with some of the load we left in Misawa. We borrowed 17516 to take our load to Korea, returning the same day. The Detachment at Haneda replaced the #3 engine and checked our nose wheel repairs. The next day we left with 17510 to go to Montreal.

You received the Air Force Medal (AFM) for your service on the Korean Airlift. What does your AFM citation say?

In 1954, the Commanding Officer of 412 (T) Squadron informed me that I had been awarded the Air Force Medal (AFM) He offered his congratulations and said your AFM will be presented to you at Rideau Hall by Governor General Vincent Massey. I thanked him and returned to work.

The citation for my AFM reads as follows: "Corporal Reed has, during his tour of duty with 426 Transport Squadron on the Korean Airlift, participated in thirty- seven round trips to the Far East, in support of the United Nations operations in Korea. Throughout these trips he has exhibited exceptional skill as a flight engineer and technician. On a flight between Shemya, Alaska and Misawa, Japan, he displayed a typical example of his resourcefulness. This particular flight had taken unduly long as a result of the loss of an engine en route and excessive head winds. Due to a mechanical failure, the nose wheel became damaged on landing at Misawa and the flight was unable to proceed to Toyko as scheduled. Unable to obtain the necessary replacement parts and despite the fact he had been on duty for approximately sixteen hours, Corporal Reed proceeded to manufacture the required replacement brackets, carried out retraction tests and finished off the remaining necessary adjustments practically single handed. The aircraft was then able to proceed

to Toyko where permanent repairs were effected. Corporal Reed has been responsible on numerous occasions for keeping his aircraft serviceable under adverse conditions by dint of hard work and constant, unswerving devotion to duty".

After 426 Squadron you were assigned to #4 Operational Training Unit (OTU), located at Dorval, as a FE instructor on North Stars. What was the role of this unit?

At the OTU we carried out conversion training for North Star aircrew: Captains, First Officers, Flight Engineers, Navigators, Radio Officers and Loadmasters. It involved instrument flying, ILS, Green Tickets assessments, three engine take-offs and landings, flapless landings, hydraulic system failures, main gear air brakes, and crew training for air transport operations.

Your last RCAF posting was to Uplands and involved assignments with 412 Squadron and in Aircraft Maintenance. Describe these assignments.

At 412 T Squadron I was employed as a Flight Engineer on North Stars and I was being trained on the Comet Aircraft until they were grounded. In 1955 I asked if I could return to AEM duties in maintenance, because after seven years as a Flight Engineer, the RCAF still had not made it an Aircrew Trade. I went to Aircraft Maintenance as a Crew Chief for five years, then NCO in charge of the Engine Bay and Propeller Shop for three years, and finally the NCO in charge of Yukon and C5 (North Star) retired from 412 Squadron on the 30th of December 1966. I was very proud of my blue uniform- a few years later I donated it to the War Museum.

You continued your career in aviation after resigning from the RCAF in 1966. Describe your civil aviation experience.

After leaving the service, I applied to the Ministry of Transport (MOT) for and received a Flight Engineers License and an AME License. I was going to fly with Voyagair on charter flights using Britannia aircraft, but they were unable to get their License, so I applied to Ottawa Aero Services as an AME and was hired. Ottawa Aero Services was a flying training school, we taught trainee pilots to fly and gave a basic navigation course at night school. I saw a competition for AME's with MOT, I applied, was interviewed, and was told they would let me know in due course. About three weeks later they phoned me and said I had been accepted, and to report to the hangar on Monday. In MOT I was very pleased to see some ex 426 pilots in the VIP Flight, especially Gordie McAninch and John Grant. I stayed with the MOT in Ottawa and acquired several endorsements to my AME License. I retired on 31st August 1979, having served more than 37 years.

You retired in 1979 after 37 years in military and civil aviation. What have you been doing over the past 28 years?

We purchased a bush lot at Crown Point Ontario, 25 miles west of Ottawa on the Ottawa River and built a brick bungalow on it. We lived there and were enjoying retirement until I had a stroke in 1987. When I came home from the hospital I realized I would be unable to look after the property. We sold the property and moved to Victoria. BC. After two years in BC, we returned to Ottawa for seven years, then moved back to Victoria. I found the cold weather and snow more than I was willing to cope with.

When you think back over your long career in aviation, what stands out in your memory?

I miss the aircraft, especially the North Stars at 426 Squadron in Dorval and 412 Squadron in Ottawa. The years I spent in the RCAF were very good.

As a retired person living in Victoria, what are your interests or hobbies?

Most of my activities are, gardening, using the computer, home upkeep, going for walks and attending reunions. For hobbies I collect miniature pencil sharpeners and old car pictures, all types of cars, electric, air-cooled, liquid-cooled etc. I am enjoying retirement in British Columbia.

PNSAC

The PNS Office

Tom Mulvihill

Project North Star has an office, in Building 193, at the Canada Aviation Museum. The Association Board has decided to bring the project's electronic files, digital pictures and video files, from various members' home computers, to a central computer in

that office.

It is our hope that all master copies of important files will soon be located, in the central computer, in the folders shown here:

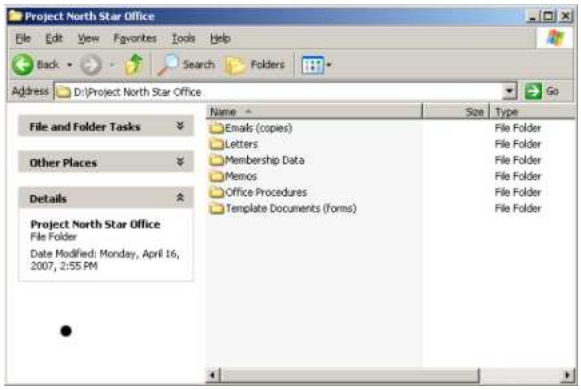

Figure 1: Important files

The museum has provided us with a state of the art desktop computer, which is connected to the museum's local area network, and which has all its data backed up each night. This is of great benefit, because it protects us against data loss, particularly of restoration photos. This is quite timely, as we suffered a complete hard disc crash, on one of the association's own computers, just weeks after its contents had been transferred to the new machine.

There is a second computer in the office, which while not as new, or as fast, is still a Pentium 4 machine, and which is connected to the internet, and is thus useful for research, and for volunteers' use of web based email.

The association's printer, an otherwise capable ink jet machine, has quite recently breathed its last breath. If any member knows of a healthy, but under-appreciated laser printer, which is looking for a home, please contact us.

Volunteers, for whom accounts have been set up by the museum, may use the new computer for project business, and to gain access to, the restoration photographs.

In the early years the project, most photos were suitable for Condition Reports, that is to say that they showed the aircraft's parts and assemblies as they were found in place. Recently the ratio has shifted to the photos, which are suitable for Treatment Reports, which is to say that they show parts and assemblies, which have been restored or are in the process of restoration.

Photos are now stored on the new computer in two locations, so that they can be located in two different ways.

The initial photo import, is to a series of subfolders, named by date and subject, as shown below:

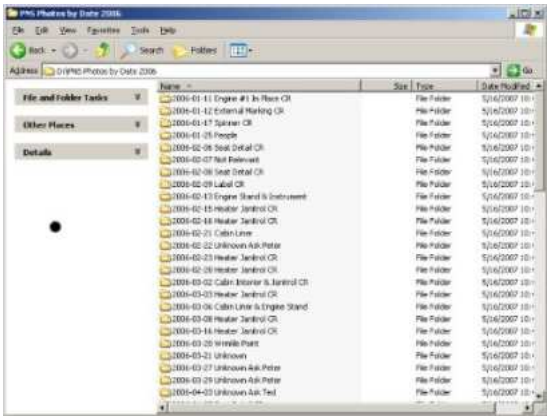

Figure 2: Subfolders, by date and subject

As one can see there is a sub folder, for each day's shooting, and the content of the day's photographic record is indicated. One might also notice (as on February 21 thru 27) that this is a work in progress. An example of a daily folder is shown below:

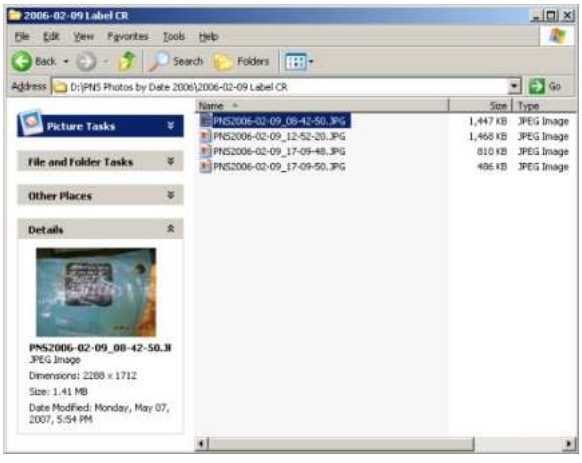

Figure 3: Daily folder

The second location for restoration photos is according to the structure of the aircraft. It is in keeping with the museum's format and uses project numbers and project hierarchy. To avoid redundancy, the photos contained here will be a smaller subset of the photos stored by date.

The folder structure is shown below:

```
D:\1967.0645 North Star

    Empennage
        Elevators
        Horizontal Stabilizer
        Rudder
        Vertical Stabilizer


        Fuselage
                Belly
                        Cargo Compartment
                Cabin
                        Headliner
                        Interior
                Cockpit
                        Avionics
                        Instrument Panel
                        Interior
                Seats
                Exterior
                Flight Controls
                Galley
                        Bed
                        Seats
                        Table
                Heating
                        Ducting
                        Heaters
                Nose Gear
                        Hydraulics
                        Strut
                        Wheel

        Wings
                Ailerons
                Exterior
                Fire Extinguisher
                Flaps
                Flight Controls
                Landing Gear
                Nacelle #1
                        Cowls
                        Engine Mount
                        Spinner
                Nacelle #2
        Nacelle #3
        Nacelle #4

D:\1967.1425 Merlin Engine #1

        Accessories
        Auxiliary Power Unit
        Crankcase
        Cylinder Banks
                Cylinder Bank LH
                        Heads
                        Pistons
                Cylinder Bank RH
                        Heads
                        Pistons
        Gear Case
                Rear
                Reduction
        High Voltage Circuit
        Supercharger
                Intercooler

D:\1967.1426 Merlin Engine #2
D:\1967.1427 Merlin Engine #3
D:\1967.1428 Merlin Engine #4

D:\1967.1429 Propeller #1

        Blades
        De-ice
        Hub
```

PNSAC

Miscellany

Restoration activity continues

Figure 1: Garry Dupont ponders ... assistant in over his head

Figure 2: Bombs? No, just freshly painted fire extinguisher canisters

Figure 3: Penney for a thought

Figure 4: Metal magic by Nelson Smith

Figure 5: Upholstery by Kessels

Figure 7: Merlin engine block ready for cleaning

Figure 6: Charles Baril, new man on the job

Figure 8: Tim Timmins ... engine doc

Figure 9: Fire suppressant cylinders ready for painting

Figure 10: The finished product

Annual General Meeting

The PNSAC Annual General Meeting will be held in the Bush Theatre at the Canada Aviation Museum, commencing at 14:00 hrs on Saturday, June 16, 2007.

North Stars-Airline operations

Trans-Canada Airlines North Stars commenced commercial operations on April 1, 1947 and were retired from service on June 30, 1961. The fleet of 21 aircraft logged a total of 193 million miles. Most of the North Stars were lease/sold in a package deal with Overseas Aviation (UK) in June 1961.

Canadian Pacific Airlines introduced North Stars on the Vancouver Auckland route on August 10, 1949 and Vancouver to Hong Kong on September 1, 1951. Three of the four aircraft were sold to TCA, the fourth was written off in Tokyo.

British Overseas Aircraft Corporation operated a fleet of 22 North Stars, called Argonauts, on African and Far East routes starting on 23 August, 1949. The last one was retired from service on April 8, 1960.

Name the Newsletter

A special thank you to those members who submitted suggestions for naming the PNSAC Newsletter and also to those that participated in the name selection process. NStar Chronicle was the preferred name by a wide margin.

Members complete training

Industrial Safety Trainers instructor Al McLeod conducted a WHMIS and Fall Arrest training session in the Bush Theatre on Monday, 9th March for the following members: Dennis Petersen, Phil Chrysler, Corey Fraser, Tom Mulvihill, Charles Baril and Bruce Gemmil.

Canada Day

The Canada Aviation Museum will be celebrating Canada Day with an Open House. Admission is free. The Storage Hangar will be open for conducted tours. Volunteers will be needed to man the North Star display.

Classic Air Rally

The Classic Air Rally is returning to the Canada Aviation Museum 25 and 26 August. There will be a Fly-in Breakfast on 26 August. PNSAC volunteers will be needed to assist with the Rally and the North Star display.

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