



The NStar Chronicle

The Project North Star Association of Canada

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Editor's Notes

Roger Button

Unfortunately COVID-19 and its restrictions continue to hamper the restoration of the North Star. So it's a good time to look at what has been accomplished to date by the restoration team which consists of both Museum staff and volunteers. This edition will continue the focus on the Merlin engines. As many of you know many of the volunteers are also members of our organization.

You will find photos of some of those volunteers in the technical article on engines three and four. You will also find a interview with Garry Dupont who has had a leading role in the engine shop work.

In the next edition we expect to have more articles about our members experiences in the restoration project.

In the meantime if you have any comments on this edition or suggestions for future editions please send them to me.

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Notes from the President

Richard Lodge

Once again, we are experiencing summer with Covid restrictions in place and suspended North Star volunteer operations. As I write this piece in the middle of July, we are seeing hopeful signs. The Museum has reopened with reduced numbers of visitors and we are expecting to arrange an in person coffee morning in the middle of August for North Star volunteers outside or under the very large door of the Restoration hangar if the weather is bad.

The Museum is reopening cautiously, and it will be at least September before the North Star restoration can recommence. Assuming that the Ontario Covid infections remain low and the Ontario government rules allow it, we would also like to have our AGM indoors in the fall.

This issue of the Chronicle is mainly about the completion of restoration of engines 3 and 4. Some of our volunteers, however, have been busy during the spring and early summer locating and acquiring a used North Star radar. This has now been delivered to the Museum. In the next issue of the Chronicle, we hope to have the story of how John Makadi and Chris McGuffin negotiated the purchase of the radar and arranged for its transportation to Ottawa from Springfield, Missouri. Quite a story.

The crate containing the radar has not yet been opened. We are expecting to do this at the same time as we gather for our in person coffee morning in August. We will be donating the radar to the Museum since it will be installed in the restored North Star.

The used radar and its transportation costs have been financed in a very pleasant but unexpected way. Earlier in the year, our Membership Secretary, Bruce Gemmill, at the request of the Board of Directors sent a message to all our members saying that for the year 2020/2021 the annual membership dues of \$25 would be cancelled and anyone who was a paid-up

member in 2020 would continue their membership for another year. The Board decided to do this because our members have received very little during the pandemic in return for their support and membership.

Members will have been surprised to receive the letter from Bruce, which as always included a form for making donations. Bruce decided that he would use a large number of unused small denomination postage stamps he had collected over many years. As a result, all the letters had a rainbow of stamps affixed to them. Bruce will have had a very dry mouth when he finished attaching all the stamps. A really nice idea by Bruce.

Although Bruce's letter did not specifically ask for donations, many of our members decided to make donations to the project. As a result we received over \$2000 in donations we were not expecting. The receipt of these donations coincided with the decision to purchase the used radar from Missouri. Although the final cost of the purchase and transportation of the radar has not been determined at the time of writing these notes, we are sure that the donations received as a result of Bruce's letter will probably cover the full cost of the acquisition.

Throughout this pandemic, Cedric St Amour, our Volunteer Coordinator, has every Thursday morning hosted a Zoom virtual coffee morning. This is normally attended by six or seven people and remains open to all volunteers and members. Anybody who has not been onto this meeting and would like to do so can contact me at president@projectnorthstar.ca. I will then send the necessary login information to you.

As we gradually get ready for recommencing volunteer work on the Northstar, we will be talking with Réj Demers, CASM Special Project Manager, to organise a workplan for the next few months, particularly in view of the fact that restoration work on all four engines has mainly been completed.

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Our Members

This is the edited transcript of an interview with Garry Dupont by Richard Lodge.

Garry why did you join Project North Star?

I joined it when I was working full time and it was a discussion between me and my wife as I knew retirement was looming and it was what I was going to do. I had seen the article that was in the Ottawa Citizen with Robert Holmgren and Tim Timmins requesting people to attend a meeting starting the project, and my wife suggested I go to it, which I did and it gave me something to look forward to. Even when I was employed I was able to physically contribute by coming in the odd day and helping out with special projects and overhaul a few components and stuff like that.

So you worked only in the engine shop?

No. When initially I was working, I worked on various other things and only after I fully retired, I showed up and said Mike Irvin "I am here. I'll be here for four days a week". That's when he asked me to go into the engine shop because they needed help in there.

Could you have worked anywhere but you chose to work in the engine shop?

Actually, Mike chose for me. Mike was the one who said go to the engine shop.

When you started with Project North Star would you have felt that you had most experience of aviation work on engines, or could you gone anywhere on the plane?

I could have gone anywhere on the plane. Of this particular engine I had no knowledge. I had never worked on these liquid cooled engines before. I never worked on a piston engine of that size before and actually I hadn't worked on piston engines for quite a number of years because with my employment most of my airplanes were with turbines. We had some small piston engined airplanes of which I had limited experience.

So quite a bit of your work in the engine shop was a learning experience apart from learning about how the Merlin 622 was assembled, you were also learning a bit about actually working on a large piston engine aircraft?

That's correct and the systems on this particular engine were completely different from anything I had ever worked on and I came across an RCAF training manual, which somebody had donated and I took it home and read it from one end to the other

over a couple of weeks. I was able to learn a considerable amount about the engine and understand the systems and it started making sense to me, so when you start assembling and disassembling and you look at a line you know what that the line is for. You know what the electrical connections are for. You know what system they belong to so it makes that part of the process much easier.

I know from when we first started working together, you said you worked for Perimeter Airlines in Winnipeg. When you were working for Perimeter, you were working mostly on Metroliners. Correct?

Yes. We had 2 Metroliners when I was there, but we also had 4 piston operated Beechcraft Queenairs, we had 6 other Beechcraft.

When you worked at Perimeter, were you working on any part of the plane and you weren't specialising in any particular part, so moving into solely engines was really a new area of work for you?

That's correct.

When you first started working in the engine shop, who were you working with?

There was Ted Devey, John Tasseron, Michel Lacasse and two other fellows, the names escape me.

I asked a few minutes ago. If you were only interested in working on the engines. Where else would you like to work on the plane? So you worked only in the engine shop?

Anything actually, I don't do well with sheet metal work, I have done some, minor bits. I could develop those skills a bit better. Hydraulic systems; I have a fairly good interest in, landing gear, the flaps, the hydraulics and all those systems. I have learned where the pumps are and how all that works now. I have also read up little bit on the landing gear to understand it a bit better and how it works and that would be interesting.

So you could, if they had been doing the landing gear at the time you started have been quite interested in working on that side of things?

Yes.

What would you say in retrospect was the most difficult part of the work you were having to do on engines 3 and 4? Was it lack of paperwork, was it corrosion or what was it?

The most difficult part was dealing with corrosion because of the amount of corrosion in the engine and also the decision-making between my career and what I would do and what the museum wanted in

restoration. The hardest learning part was learning about restoration and how to do it properly. I have had some good mentors. and I have learned fairly well on what is required to do and what to look forward to in the future when planning the project; how to tackle it from a restoration perspective rather than a maintenance perspective.

Was Mike Irvin one of your mentors helping you to know the various procedures needed for restoration?

Yes, Mike was the main mentor. He was the one that took me under his wing and showed me the requirements and the basis of doing restoration.

When you started working there, you weren't really in charge of the engine because it was a combination of you and Ted Devey who was still working there and who had worked on engines 1 and 2. So you were working with him under Mike Irvin?

Yes. That's right.

You feel one of the most difficult parts was to make the shift from keeping an aircraft flying to restoring and conserving everything?

That's right, yes.

Having done that and got into that sort of mindset, what would you feel was the most difficult part of doing the engine, of restoring the engines that you had to be involved with, or you had to work with. Which part, I am thinking of?

The biggest part with the engines was the cleaning. Believe it or not, the engines and the old oil had been sitting there for 35 years, it was very congealed and very difficult to remove. Cleaning with solvents is not a pleasant thing to do and that was about the only method we could use was to clean and put it in the parts washer. Once you put a part in the parts washer you also had to be very careful because if it was steel, when it was removed from the part washer it would flash freeze almost immediately, so it had to be removed and treated straightaway with some sort of preserving oil to prevent the surface from oxidizing.

I very much remember John Tasseran working on the pistons and all work of getting the pistons out of the block and then John working on the cleaning the piston rings. Were you very much involved in that side of things?

Yes. Cleaning up the piston rings was a real tedious job where you could spend a whole week on one piston ring trying to free it up by scraping away the corrosion, by tapping it to free the rings. Sadly, a lot of them broke. There was nothing we could do to free them up. We tried various chemicals, soaking procedures, vibration procedures, putting them in

sonic cleaners so that the vibration would free up the dirt, but nothing seemed to work really well, except getting in there with a little scraper and trying to scrape them clean.

And when you did manage to free the parts and get them clean, you couldn't use a glass bead machine to do any cleaning because the parts were aluminum so we had to use Scotch Brite and other things to clean them?

Correct. The purpose of glass beading is to remove corrosion and not to clean. If you glass bead a surface, it changes the outer texture of it considerably. In the engine shop we had at Perimeter, the only time they used glass beading was for removing the outside surface of the engine block and then they could prepare it for painting.

Now that you have finished the main part of the work on engines 3 and 4, what are the main additional parts or work still to be done on engines 3 and 4 and maybe on engines 1 and 2?

Réj [Demers] wants to remove the engines so we will reinstall engine 4 when it is ready and then we will go back and will work on each engine successively and then work on the firewall and behind the firewall with the engine removed. At the time when we do this we will inspect the engines to see if corrosion has come back in some areas and I notice on some of the engines during Canada Day when we removed parts and cowlings to display the engine that there was corrosion showing up in certain areas where it had not been treated properly. So when we remove the engines, and Réj agrees with me, we will put them back in the engine shop and go over them thoroughly. We have also found some issues with some of the cowl parts just not being adjusted properly. So in the end, I would like to have all four engines installed on the wings properly treated so that we don't have to worry about them again and also the cowls adjusted and done properly so that at any time we can remove the cowl parts and reinstall them with ease. So that in the future, if you want to display the engine again, you could effectively remove all the cowls on all four engines with ease and then reinstall them without making any big issue of it.

Effectively you have got to remove any distortions in the cowl panels. So those are the things to be done? When you are finished working on the Merlin engines, what would you like to do? This is purely a personal thing and nothing to do with the Museum. More engines on a different plane or working on the airframe?

It really doesn't matter to me, whatever the Museum sees fit as a project, I am willing to tackle it.

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The Four Merlins: The Second Two

Based on Bruce Gemmill's notes; reviewed by Garry Dupont, and with editing assistance from Richard Lodge

After its removal in the Spring of 2012, engine #3 was completely stripped of all accessories, pipes and hoses, and disassembled. The block, cylinders and pistons were cleaned, and work was begun to re-assemble this engine. It was at this point that a lack of volunteers started to slow down the restoration process.

The engine rebuild was nearing completion by April 2013, with magnetos and a few other accessories left to be installed. The basic engine frame was back together. The three radiator sections were cleaned and painted, then attached to the front of the frame. The rear cowl ring had been disassembled, and new mounting hardware was fitted before the parts were painted and reassembled. The front cowl assembly (radiator cover) was also cleaned, repaired and polished, ready to be installed. Other cowl panels were then cleaned, repaired and polished, ready to install once the complete engine was in place. Work was also underway on a host of pipes, cables, accessories, and fittings needed to complete the assembly of the engine and the Quick Engine Change (QEC) prior to installation on the aircraft.

By September 2013 engine #3 was almost completely reassembled, with only the supercharger and inter cooler preheat assemblies left to install on the engine, which had been moved to the QEC engine frame in early summer. The work slowed, due to summer down time for staff and volunteers. The auxiliary gearbox was removed from the engine firewall and was then being disassembled. This was the last major assembly that had to be overhauled before the engine could be placed back on the aircraft.

Engine #3 was nearing completion by December 2013. The supercharger and inter cooler preheat assemblies had been installed, along with the propeller reduction gearbox. While this work was being carried out by the engine crew, the remainder of the volunteer workforce busied themselves completing the numerous cowl panels, pipes, hose and other pieces needed to complete the engine. Two items that seemed to take forever were the large steel exhaust shrouds. A lot of hammering was needed to pound out years of dents, then numerous rivets and all the Dzus fasteners and springs needed to be replaced. The complex shape of the exhaust shroud made this challenging work. Further delaying completion was the search for suitable clear coat to protect the steel from corrosion. The old clear coat used successfully

on engines #1 and #2 was no longer available. A suitable replacement was located, the shrouds were clear coated and serial numbers were stenciled on.

The auxiliary gearbox was disassembled, and significant corrosion was found on the bearings inside. Bearings had to be ordered from England. Meanwhile, the gearbox was cleaned and painted. At the same time the large DC generator was dismantled, repainted and reassembled, as well as the air pump, and the tachometer generator and propeller synchronizer. Once the new bearings were installed, the gearbox was completed, and the generator, and air pump were attached. Finally, the gearbox was installed on the firewall awaiting the installation of the engine.

In April 2013 #3 engine frame was completed after the installation of the engine and supercharger. Fitting the many cowl panels proved difficult, due to the extensive rework that many of these items went through, causing some alignment difficulties when fitting these panels onto the engine frame. This work was done in July 2014, and the completed engine was successfully installed on the aircraft.



Volunteers Bill Tate and Garry Dupont discussing work on Engine 3.

The last engine to undergo restoration was removed and work immediately began in the Engine Shop to disassemble the engine. All cowl panels, pipes, hoses and accessories were removed and stored until space was available to restore these items. The engine was moved to the yellow rotating stand at this point. The priority was to disassemble the engine. The crank case was cleaned and clear coated before installing back into the yellow stand. The refurbished crankshaft was installed in the engine block, and the connecting rods and pistons cleaned and polished. On this engine we were able to remove the propeller shaft from the reduction gear box, unlike engine #3 the shaft could not be removed. Work was then begun on the more complex

cylinder heads and valve train assemblies.

Work then proceeded on much of the ancillary equipment for the engine. Once the frame was completed and placed on the blue stand, the engine block was removed from the yellow stand and installed in the frame. The supercharger & inter cooler were completed and installed, as well as the reduction gearbox. The radiators and header tank were restored and painted, and two of the three radiator sections were installed. Restoration work was then begun on the air intake system, and many of the fuel and oil lines. The starter motor was found to be very corroded and disassembly and repair not viable. A replacement unit was located and installed. The fire suppression lines were complete and would be installed along with the cowls when ready. Some of the cowl panels were restored, although it was found that this engine had more corrosion than the other three engines. Possibly it had been in service longer. This meant that more work was required to refurbish each of the many panels.

After restarting work on the aircraft in late January 2018, the conservation effort focused on the completion of engine number #4 accessories and cowl panels. Many of the cowl panels required extensive repairs, including making many new panel stiffeners, since the old ones were often badly corroded. Besides painting and polishing, the refurbished panels also required new part number and serial number stencils, and this led to investigating missing stencils from the same panels on earlier engines.

Before final assembly could take place, the radiator cowl panel had to be fitted which was done by December. The panels were fitted and installed with some fasteners being replaced. The front support was installed for transportation.



Engine 4 completed and ready to be moved to the Storage Hangar.



Some of the crew who worked on the restoration of Engine 4 (Richard Lodge, Réj Demers, Garry DuPont, Ted Devey, Charles Baril).

On December 19, 2019, the engine, still on its blue stand, was towed by the Museum forklift, from the Restoration Shop to the Storage Hangar where it now sits next to the North Star prior to re-installation on the aircraft.



Réj Demers (Museum Special Projects Manager) very carefully bringing the Museum forklift to lift one end of Engine 4 ready for moving from the Engine Shop to the Storage Hangar on 13 December 2019.



Engine 4 starts its long, slow, cold 20 minute journey from the Engine Shop to the Storage Hangar to join the North Star aircraft.



The Museum's forklift, driven with great skill by Réj Demers, hauls Engine 4 towards the Storage Hangar. The blue engine stand and its tiny wheels certainly was not made for racing!

2020 Finally early in 2020, before the lock down, propeller #4 was assembled and stored on the refurbished prop stand in the Storage Hangar ready to mount on engine #4.

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