



...And Then The



The hangar smelled wonderful throughout the rebuild, with all the associated wood in play. ALL GAVIN CONROY



A view very early in the restoration, when parts of the instrument panel were trial-fitted, along with the pilot's rudder pedal assembly.



re Were Three

Gavin Conroy details the journey of the latest Mosquito rebuild to take flight from the Avspecs hangar in Ardmore, New Zealand

On January 13 this year, DH Mosquito FB.VI PZ474 became airborne for the first time since the 1950s, being the third airworthy 'Mossie' rebuilt by New Zealand's Avspecs and Mosquito Aircraft Restorations. It's a feat that until just a few years ago many thought almost impossible. This latest FB.VI will soon be delivered to its new owner, the US-based collector Rod Lewis.

The early years

Mosquito PZ474 was delivered to New Zealand in a very sorry state, as it had languished outside in the USA for many years. After being asked by Rod to source a Mosquito project, Avspecs boss Warren Denholm considered PZ474 as an airframe ripe for restoration. Discussions began in late 2013 between Warren and Jim Merizan, who was then the owner of PZ474, about the possibility of him selling

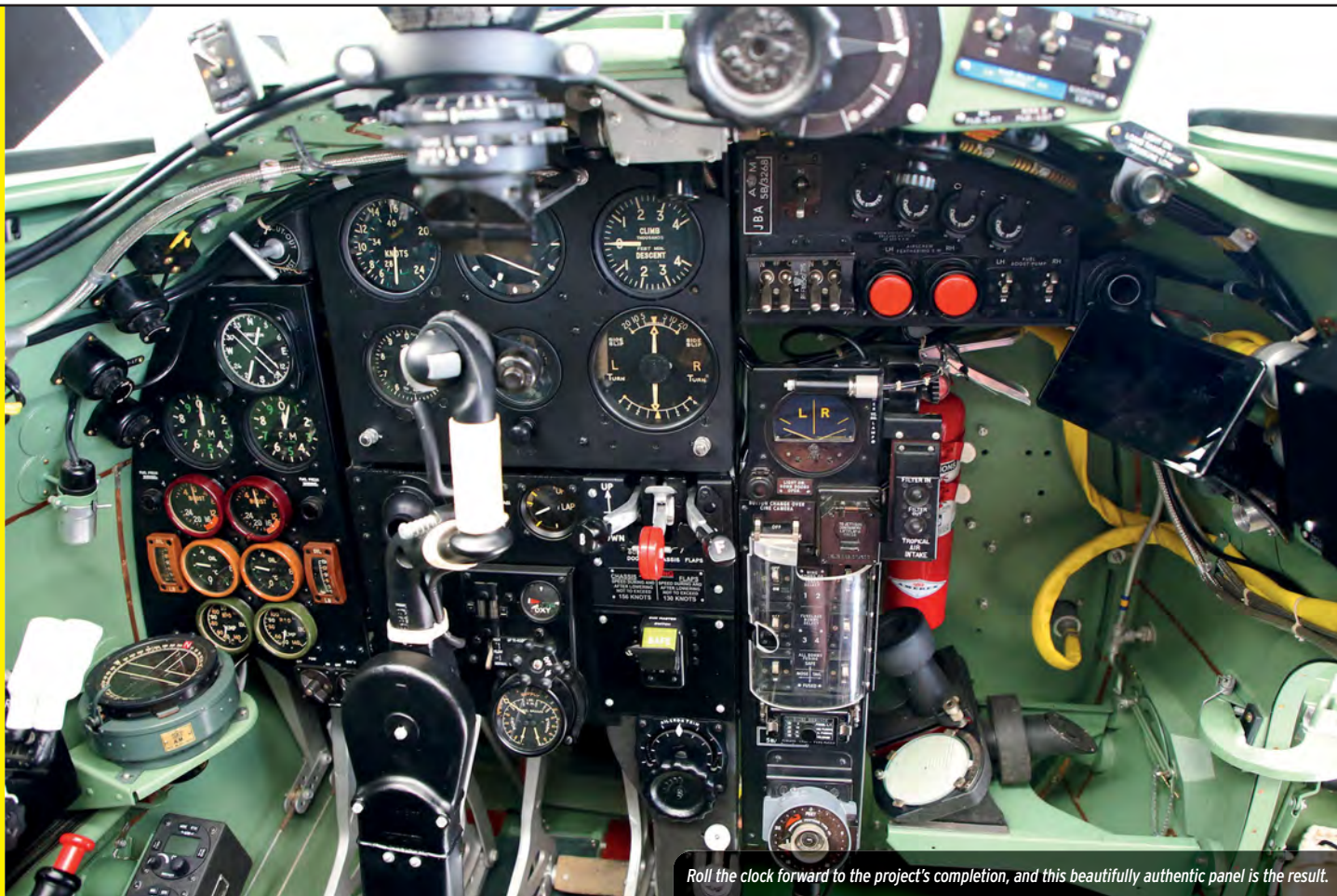
the airframe to Avspecs to be restored. Simon Brown, of Platinum Fighter Sales, was instrumental in forging a relationship between Jim Merizan and Warren, essential for the coming negotiations. Jim had a strong attachment to the aircraft and took some persuading to sell it.

In February 2014, Warren and one of his senior engineers at Avspecs, Derek Smith, travelled to Jim's facility in Chino, California, to 'package' the aircraft for

shipping to New Zealand. Some of PZ474's parts had gone missing when it was parked, derelict, at Whiteman Airport, near Burbank, Los Angeles. Matt Jackson, a corporate pilot who looked after the P-51D Mustang owned by actor Tom Cruise, knew of some Mosquito parts that were at Whiteman and put them in touch with a man who had them. Warren and Derek found →



Avspecs' new Mosquito seen in the Hauraki Gulf region in January, during its last flight in New Zealand. Steve Hinton was the pilot, with the aircraft's owner Rod Lewis in the right-hand seat.



Roll the clock forward to the project's completion, and this beautifully authentic panel is the result.

“Original exhausts can be found occasionally, but many are not in good enough condition”

him and discovered that he had the spinners and side cowlings hanging as decorations in his hangar. Warren duly purchased the components and loaded them into the container with the rest of the project.

The two Mosquitos to fly previously in New Zealand (KA114 and TV959) required new-built wings and fuselages; the ravages of time made restoration of the original items impossible. It was the same situation for PZ474, so Glyn Powell of Mosquito Aircraft Restorations got to work on building the airframe, while Warren and his team at Avspecs scoured the world for parts they would then repair/restore. What they could not find would need to be built from scratch. As this was Mosquito number three for them, they had learnt a great deal about the type, so could put a build process in place as well as work out all the intricate details that needed to be found or made. When it comes to rebuilding an airworthy Mosquito, arguably, no other company in the world

has such know-how. Also, Warren had made contacts globally and had been buying parts when opportunities arose, some from collectors, others from people who were not too sure what they had; items were even discovered on internet auction site eBay. So, while the wing and fuselage were being made, a huge amount of other work would ensure the aircraft could be delivered to the owner in the agreed timeframe and budget.

Wings and fuselage

The new mainplane arrived at Avspecs in October 2016; the fuselage had been built already so it was a matter of connecting the two and achieving proper alignment. Seeing a Mosquito laid bare makes you appreciate just how much work goes into creating the finished result... and explains why many people thought that building flying Mosquitos couldn't be done. Avspecs had the desire to 'arm' PZ474, so the wing needed modifications to add more strength for the weapon hard points; the



keen eye will notice the raised sections on the upper and lower wings. At that time, the team were unsure what they would load on the aircraft, but with the requisite preparation work done, Warren would discuss 'arming' it with the owner as the rebuild progressed.

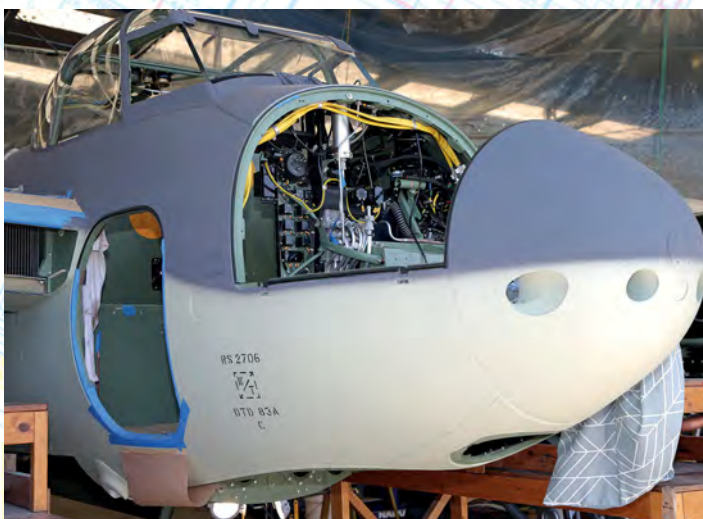
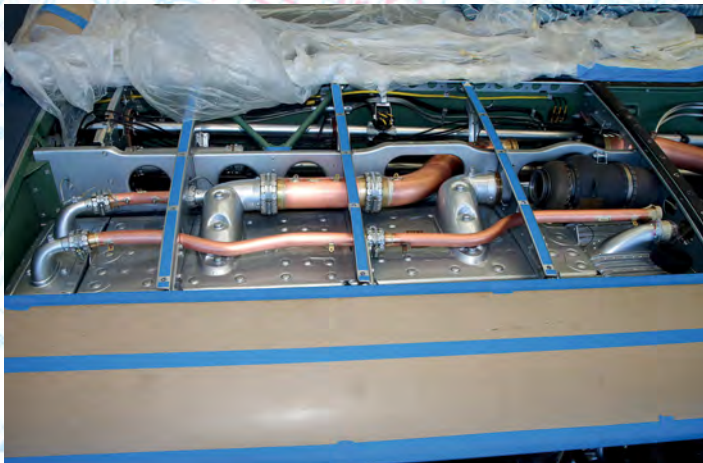
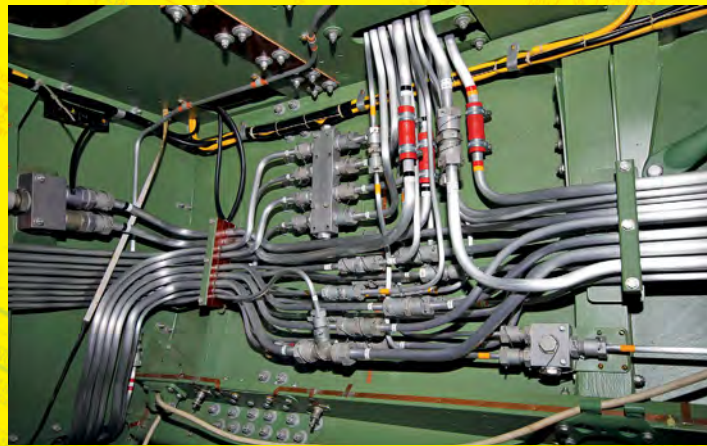
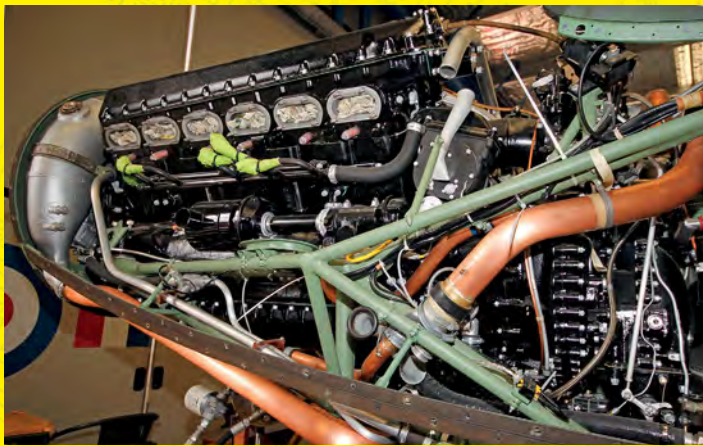
Once the trial fit was completed, the wing and fuselage were separated once more. The restoration team marked out the exact placement for the wing, then cut out sections to ensure a glove-like fit. This is quite daunting to watch even though true professionals are at work! I could only think back to my woodwork class at school, when the teacher

Above
Mosquito PZ474 finally reaches sunlight in its freshly applied primer coat. Interest was very high at this point, as it was a closely held secret as to how the aircraft would finally look.

Above right
A view from on top of the wing, showing one of the large radiators housed in the leading edge of the mainplanes. Copper tubing connects the radiators to the engines.

Right
Evident here is the pristine paint finish and the plumbing required on the rear side of the instrument panel. The crew access door is one of the last items to be attached.

said: "Measure twice; cut once," but in this context not a truer statement could be spoken.



Top left

The port Merlin engine installation seen well under way, after restoration work on the powerplant itself by US-based firm Vintage V12s.

Top right

This is the hydraulic junction fitted in the right-front section of the bomb bay. These lines run to all manner of systems in the Mosquito, including undercarriage, flaps and bomb bay doors. The workmanship is stunning and took many months to complete.

Above left

Looking forward at the quartet of replica 20mm cannons fitted to PZ474. Even on close inspection, you'd never know they weren't original.

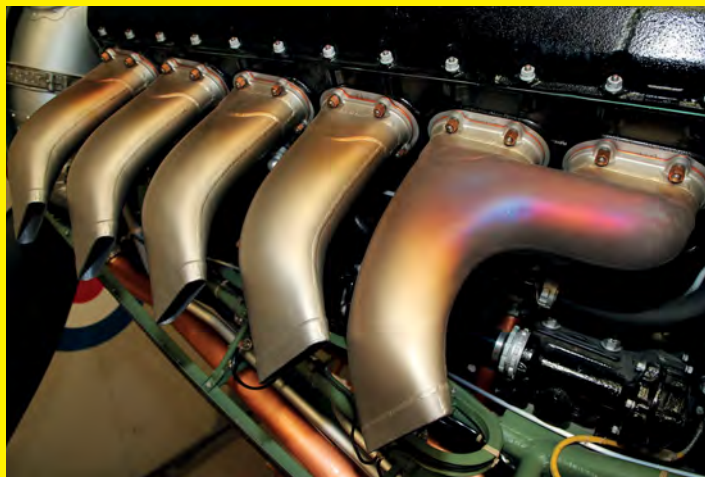
Above right

The ammunition boxes for the four .303in guns in the nose. Replica rounds run from the box down to the guns to add extra realism.

Engines and radiators

The airframe arrived with two powerplants and their mounts, and some engine cowls, so that was a major step forward as most components were in good condition. However, all would be overhauled or repaired. The Merlin engines that arrived with PZ474 were those fitted to it when it left de Havilland in Hatfield, Hertfordshire, in 1945, and were in good shape for restoration so were sent to the specialist engineering firm Vintage V12s, in Tehachapi, California. Propeller units were also restored in the USA. But the cooling system is very complex and critical to the rebuild. Radiators, oil

coolers and cabin heaters were manufactured from scratch by New Zealand company Replicore based in Whangarei, North Island. Second-hand radiators are prone to leaking and repairs can be impossible to make good; as one leak is fixed another can spring up, so an entirely new set was made for the Mosquito. These are leak and pressure-tested before they arrive so should provide trouble-free cooling for many years. Engine exhausts or 'stacks' were another feature that needed to be sourced. Jerry Yagen is the owner of the Virginia Beach, US-based Military Aviation Museum - his Mosquito KA114 was the first of the three ➔



Top left
Once it was rolled out into the sun, PZ474 could no longer hide its new look. The machine guns were yet to be fitted in the nose, as work on the rear face of the instrument panel was not complete. While the port engine was ready to be run, the propeller on the starboard powerplant had only just been fitted.

Top right
The exhaust shroud is attached in this study; exhaust stacks are only fitted when the engine is ready to be run. Note the three-ply bullet-proof windscreen.

Above left
The starboard engine being run to check it's working well. Propeller system assessment is also done at this point.

Above right
Multi-hued exhaust stubs are an attractive feature of the restored engine.



Mosquito PZ474 heading off on its second test flight.

Avspecs airframes to fly and has original stacks that are still prone to cracking. Original exhausts can be found occasionally, but many are not in good enough condition to be installed on a freshly restored Rolls-Royce Merlin creating more than 1,500hp. Thankfully, another New Zealand company, Specialised Welding, developed software and tooling to make brand new sets of stacks for the aircraft.

Bomb bay

One very complex area when it comes to restoring a Mosquito is installing the hydraulic systems, and the best place to see how much work is required is in the bomb bay. The myriad hydraulic lines running through the aircraft are head-scratching to the casual

observer. In the bomb bay there is a main junction that has lines connected to it, and some running the length of the aeroplane in all manner of different sub-systems. There were many months of toil in doing this job; it was tedious at times, but the team is very proud of its efforts as it is the lifeblood of the aircraft and allowed the project to progress rapidly as several engineers worked in

different areas. The bomb bay on PZ474 is fully operational and a work of art. When Rod Lewis saw the aircraft in January for the first time in a few years, the bomb bay was opened and his reaction was simply: "Wow!"

In the section forward of the bomb bay is the cannon compartment, which has been rebuilt to be 100% faithful to the original aircraft. The four 20mm

Landing after the fourth flight in the test programme.



“...it was decided to create replica 60lb rocket-projectiles, such as it would have carried while operating with 235 Squadron”

cannons were made by John Harvey of Rubber Band Ltd, yet another New Zealand company. The weapons are made of plastic and rubber, but look suitably realistic and offer a useful weight saving over the originals. More of this work can be seen in the nose section, where the four .303in machine guns are positioned.

Ammunition boxes have been made from scratch for the cannons and machine guns, with enough rounds to show the feed shoots looking full.

Engines and propellers

Once the deal was done and the aircraft was procured, José Flores

from Vintage V12s met Warren at Chino to collect the two Merlin engines for overhaul. Later, they arrived in New Zealand one at a time, which gave the team time to install one powerplant, getting it fully plumbed before the second engine arrived. All the copper and steel piping was cut, mandrel-bent and fitted in-house; this work

was also something Rod Lewis mentioned as being a stand-out feature, and the copper tubing looks amazing. It is always special to see a freshly overhauled Merlin engine arrive to be fitted in a restoration, a process that takes several weeks if done properly. The propeller units were shipped in pieces, so the team also had to build these towards the end of the project before they were mounted. They only get in the way if attached too early!

One aspect of any Mosquito project is that the type is very difficult to work on if sitting on its wheels. So, once the fuselage and wing were connected for the last time, the aircraft was elevated on jacks in a flying attitude, low to the ground, to ease access.

As the project progressed and the internal fitting out totalled around 80%, the 'Mossie' was positioned in the three-point attitude, so undercarriage bay work could be completed and undercarriage system checks conducted. Once the gear was connected, undercarriage doors were installed and then power was supplied to the aircraft, to check



Here are the finished rockets on rails, looking highly authentic and contrasting well with the colour scheme. They are designed to be flown, so hopefully we will see this happen in the USA in the months ahead.



the legs worked as expected. A modicum of fine tuning is normally needed, but once that was tackled, the aircraft was again returned to flying attitude for final cockpit detailing and tweaking of the engines and radiators.

All the original instrument and cockpit systems were overhauled, too, either in-house or by trusted contractors.

Mosquito PZ474 represents an aircraft flown by 235 Squadron and covers the period when the unit's machines flew with invasion stripes. The painting process took several weeks, as the airframe had to be rubbed down with abrasives and primed before top coat application and finishing. Yet again this mammoth task was undertaken by Avspecs. To complete it, they fixed plastic sheeting from the roof to the floor in the hangar, so the aircraft was essentially cocooned.

After they had followed a methodical process that cannot be rushed, the pristine aircraft was rolled outside towards the end of last year for the world to see – and it surpassed most people's expectations.

Many observers thought it would be painted the same as KA114, in Dark Green and Medium Sea Grey camouflage, but with different markings. However, with owner Rod's blessing, PZ474 received the 235 Squadron livery of Extra Dark Sea Grey over Sky... and the result is spectacular!

Underwing stores

One side project, as mentioned earlier, was 'arming' the aircraft and it was decided to create replica 60lb rocket-projectiles, such as it would have carried while operating with 235 Squadron. Warren was able to measure an original rocket as well as a rail and mounting

points, so perfect facsimiles could be fashioned. The aircraft wasn't test-flown in New Zealand with these fitted, but should be when flying starts again in the USA.

Toward the end of last year, engine runs began and were all too easy, with no 'gremlins' appearing before the test schedule. Warren took the aircraft for two taxi runs and it was then declared fit to fly. A Civil Aviation Authority of New Zealand (CAANZ) inspection took place and an airworthiness certificate was granted. The aircraft would fly again as ZK-BCV, the registration it sported in New Zealand in the mid-1950s.

In the lead up to Christmas 2018, the aircraft was 99% finished, so the team spent time applying the remaining large stencils and working on the period radios that will go back in the aeroplane, as well as other small items of finishing. In early January, the aircraft was completed several days ahead of the expected first flight, which made things much easier on the day itself; no last-minute rushing around was required.

Aerial debut

Owner Rod Lewis arrived at Ardmore on January 13 in order to witness the first flight. Test pilot Steve Hinton had arrived several days earlier to prepare, and the aircraft flew twice on the

13th. Just two small 'bugs' were reported and fixed quickly. Over the next few days, three more flights were undertaken, including a full asymmetric test and with both engines shut down during flight at different times. This is not a requirement for the CAANZ, but it is for the North American Federal Aviation Administration. On the last flight in New Zealand, Steve Hinton took Rod Lewis for his first trip in a Mosquito, and it was during this sortie that *FlyPast's* air-to-air photos were taken.

With the test programme in New Zealand completed, the aircraft will be dismantled and sent to the USA by sea. Returning from his excursion in PZ474, Rod said: "The Mosquito sure is a beautiful aircraft to fly in! It is fast, stable and sounds amazing and I cannot wait to get it home so I can fly it myself, as I am really looking forward to it. The build quality is amazing and everyone involved should be very proud of their achievement."

So, after more than 75,000 man hours spent rebuilding this beautiful machine, it will hopefully go on to fly for decades to come. Being part of Rod's collection means it will receive the best possible care.

It is wonderful to see three airworthy Mosquitos in the USA, but one cannot help but consider when a Mosquito will fly again in the UK. ●

Above
The Avspecs team following the last flight in New Zealand. Owner Rod Lewis is in the front row, far left.

"...after more than 75,000 man hours spent rebuilding this beautiful machine, it will hopefully go on to fly for decades to come"



The invasion stripes on this newly airworthy FB.VI contrast noticeably with the New Zealand countryside.