

## MecSoft restores the pride of the Royal Air Force

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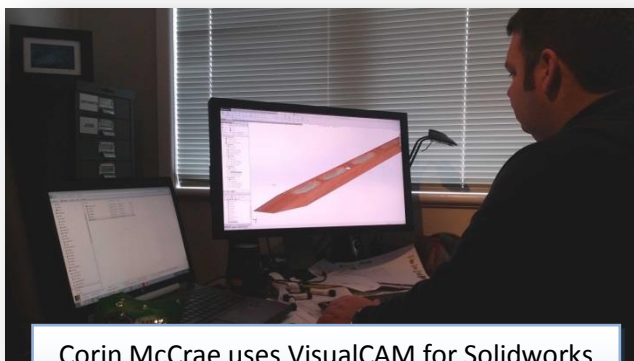
Through the efforts of several passionate individuals and skilled companies, Auckland in New Zealand has become the world centre of Mosquito WW2 aircraft restoration and reconstruction. In 2013 the first of these planes flew again and has since been seen at air shows in New Zealand and North America. The next one is close to completion, along with wing assemblies and fuselages under construction for more planes for US clientele.



Central to the cooperative operation has been the use of Solidworks CAD models recreated from the original blueprints by woodworker and restorer Corin McCrae so that he could use a CNC router for manufacture of consistent and accurate components. Over several years of work he has fully CAD modelled most of the plane from original blueprints, ensuring that assemblies go together as planned.

The router is used for cutting, profiling and shaping wing components and for shaping scarf joints, and has also proven useful for setting out large-scale jigs and templates with a pen tool and for locating positioning pins. Many more uses for the technology became apparent as its use progressed, and the accuracy and symmetry provided by the CAD and CAM system made assembly much more straightforward than any other traditional method.

The first router used was a 1.5 x 3.6 metre Techno supplied by MecSoft Oceania, along with [MecSoft VisualCAM for SolidWorks](#) machining software. The need to process larger parts and assemblies prompted the acquisition in 2013 of a 1.8 x 5.4 metre PreciseCam custom-built machine with a very useful 400mm of gantry clearance.



Corin McCrae uses VisualCAM for Solidworks to machine the wing spar components.

This coincided with a move to separate and specialised premises for Corin and the establishment of his company [Aerowood](#) in a former joinery workshop in Pukekohe south of Auckland, where he gained his first experience in woodworking as a teenager. He is now contracted by [Avspecs](#) and other warbird restoration enthusiasts to provide complete wing and airframe assemblies built from new wood materials but incorporating

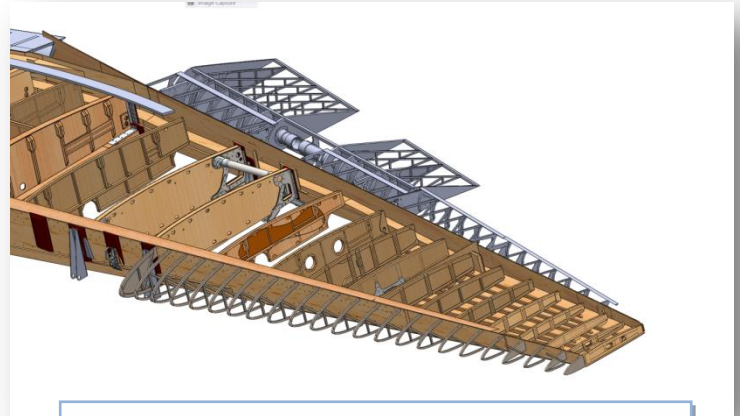
the metal fittings and mechanical parts from original aircraft. The passage of time took a heavy toll

on the glues and plywoods used in the original aircraft to the point where there were no original planes left still capable of flight, so these rebuilt examples have caused great excitement in the aviation scene. The throaty roar of two Rolls Royce Merlin engines is guaranteed to raise the blood pressure of any keen observer.

The biggest benefit to Aerowood has been that the deep thinking and planning is done well in advance of the involvement of the hands-on employees, and before any 2-part glues are mixed putting the assembly under time pressure. The accuracy and symmetry of the machined parts is guaranteed and makes the assembly much more straightforward. Repeatability is achieved easily and reliably.

As a result, the company has work ahead of it for many months, mostly for international clientele.

Corin McCrae is very impressed with the power of MecSoft's VisualCAM, using the advanced features of the Professional level to good effect.



CAD model of the wing assembly showing wood and metal components.



Wing ribs being assembled in the jigs produced on the CNC router.

surface of the model, so this enables a specially made weighted pen tool mounted in the spindle to be used to scribe drawing lines on both flat surfaces and 3D shaped and constructed parts facilitating easy and rapid assembly. All layouts are drawn onto jigs and fixtures including centrelines to enable alignment of large assemblies.

The integration of the CAM within SolidWorks is also very important as any changes to the model can be immediately updated without the need for Export and Import.

This is a unique approach in aircraft restoration – CAD and CNC is commonplace in modern aviation manufacture, but not so in the restoration of vintage aircraft. You can be sure that if this technology had been available to the old-timers, they would have used it.

Support and advice for the efficient utilisation of the CNC machinery and CAM software has always been freely and readily available from MecSoft's reseller – James Dowle of [MecSoft Oceania](#).

The Knowledge Base makes it very easy to apply a proven toolpath strategy to a new project with the machine-code output available within seconds.

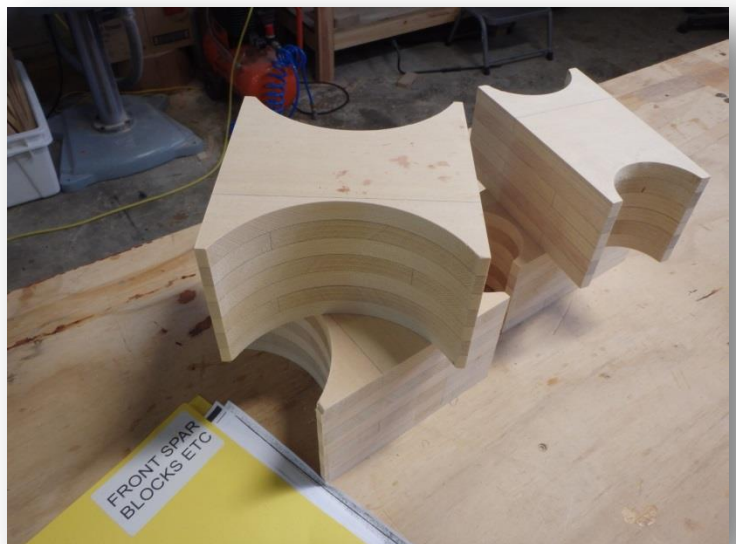
The Engraving toolpath method follows the centreline of the tool along the



The Ailerons during the assembly process



CNC machining of wing spar recesses

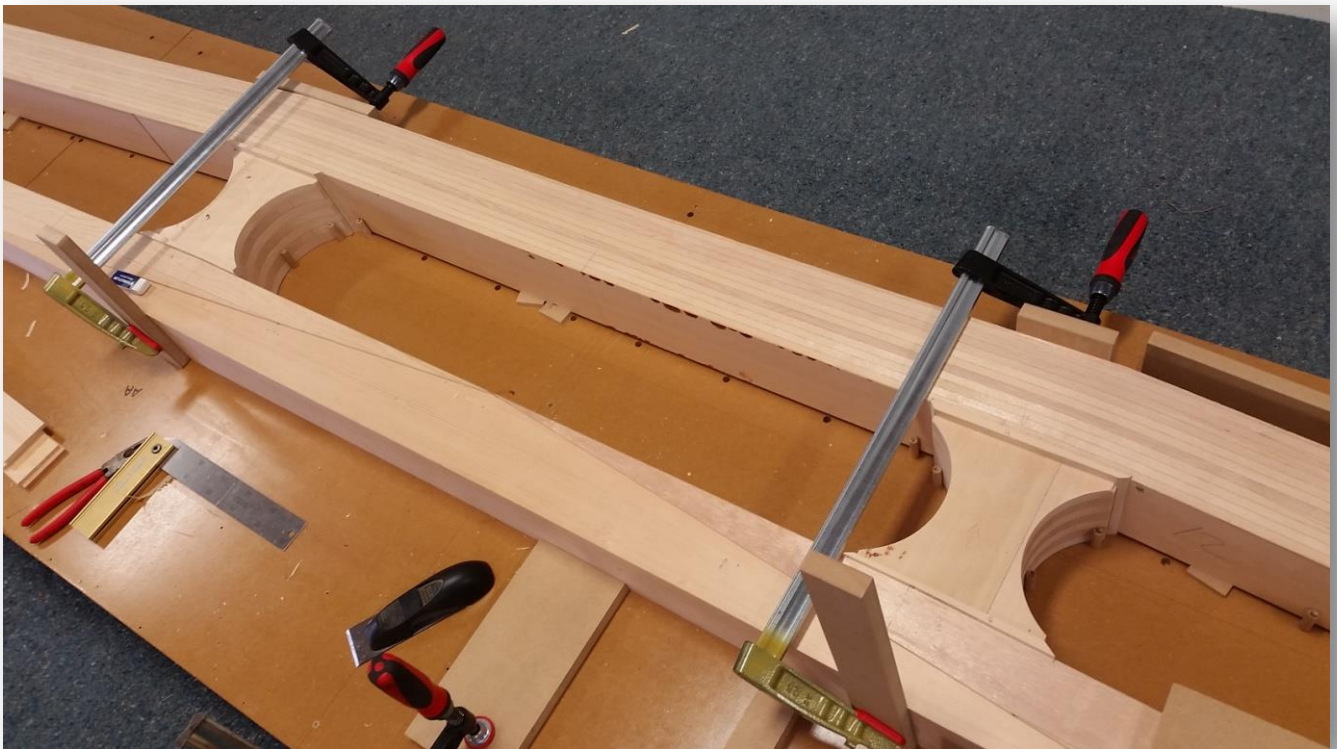


Machined spar blocks.



Assembling the wing spars

The wing spar gets glued and clamped.





The assembled wing spar on jig.



The finished product gets a test flight in New Zealand before being shipped to the US to join the private collection and appear in air shows.



The original RAF Mosquito

*This is photograph is from the collections of the Imperial War Museums,  
Source: Wikipedia*