

## Build your own Supermarine Spitfire!

*Flight Journal*

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History is being reborn in Cisco, Texas, where Supermarine Spitfire is manufacturing 90-percent-scale (full-size!) kits of the WW II fighter. You, too, could own and fly one of the world's most legendary aircraft! Here's the scoop:

Iconic aircraft seem to be born that way.....Few would doubt that the North American Mustang and the DC3 were winners from day one. Pilots argue endlessly which are the greatest aircraft; if you make the topic military fighters that literally change the world, the Mustang and the Supermarine Spitfire certainly would be on most every list.

Born in the mind of a man whom many have heard of – R. J. Mitchell, yet developed to its fullest potential by one few have heard of – Joseph Smith, the Spitfire story reads like a movie script. Born out of necessity in the 1930's, developed with daring technology for the time, the phrase "just in time" fits the Spitfire. Production was just in time for the Battle of Britain – the continued development of the Rolls Royce Merlin engine was just in time over and over to keep the Spitfire (and Mustang) competitive. Continual development of the airframe led to the Spitfire filling roles it was never intended for – reconnaissance, bomber, and carrier base interceptor – just in time.

Today the Spitfire in kit form lives again in Cisco Texas as the Mk 26B.

As a pilot from a very young age, the idea of a "real" Spitfire gelled in the mind of Michael O'Sullivan. Mike grew up in Western Australia on a cattle station. An uncle collected WW II surplus in the late 1940s for pennies on the dollar, so Mike grew up a WW II buff. "I had 50 acres of trucks, tanks and airplanes, including WW II Spitfires, to play with." Mike started Supermarine Aircraft in Brisbane more than 20 years ago. For the history buffs, Mike owns the Supermarine name, acquired from the original family that held it since the 1920's.

"I wanted an aircraft for myself that was as real a Spitfire as I could make, not just something painted up like one." Mike and Supermarine Aircraft have invested years of engineering work, ground and flight testing, engine dynamometer testing, hundreds of instrumented test flights for flight control, engine management, and the endless list of problems to be solved behind every successful aircraft.

"We started out selling kits in Australia, South Africa, New Zealand, and Europe. The rules for kit aircraft are very stringent, especially in the UK; we basically have engineered this aircraft from spinner to tail. The whole aircraft is load tested to 9 G's – we have done complete ground tests and hired a British test pilot to fly a complete CAA test program, spins, out of CG testing, the whole lot. My structural engineer, Mike Burns, has been with me all the way in the design."

"The engine took a lot of thought and a step-by-step development process. The first generation kits were Jabaru powered. While this is a fine engine and does very well in the earlier kits, a liquid cooled inline V was the obvious solution."

In his search for the perfect power plant, Mike discovered an interesting fact. An Australian company routinely uses a version of the General Motors LS 2 series aluminum V8 as a pump engine. Mike immediately realized this duty cycle is very similar to the high demands made on aircraft engines – start up – warm up – high continuous power for hours – cool down – shut down. Starting with this dash number engine, Supermarine spent more than three years perfecting every aspect of making this outstanding engine the perfect choice for the Spitfire. "Anyone experienced in this area can tell you there is no such thing and simply dropping an automotive engine in an aircraft and flying away. We spent endless hours engineering this V8 to our needs, including our own in-house Propeller Reduction Unit (PRU)." Mike and Supermarine chose a belt re-drive combined with an electrically controlled propeller for a trouble free solution. Another big part of the solution is an Engine Control Unit (ECU). Mike asked MoTeC of Sidney to create a purpose designed ECU that would meet the unique demands of aviation. "576 test flights and a lot of dyno time, but we now have an ECU that will handle anything a pilot could ask. We ask the builder to install the ECU as is, just plug it in." To date, this proprietary ECU unique to Supermarine Aircraft has worked flawlessly.

Mike has been asked if this is just another kit, or is it really a Spitfire.

"Well, it isn't a legacy Spitfire; they have all been built. There are perhaps 80 in the world, with one half that flyable. Like any of the front line fighter warbirds, the cost to own and operate is very, very high."

"My goal from the outset was to build the closest thing possible to a legacy Spitfire without the prohibitive cost. It had to look, fly, and handle like the legacy Spit or I wasn't interested."

So, is this a Spitfire or not?

Alex Henshaw is a well know name in the history of the Spitfire. Hired as the factory test pilot in the 1930s and carrying on right through the war, he has perhaps flown more Spitfires than anyone else in the world; a record never to be broken.

"Alex Henshaw not only flew Spitfires, but he flew nearly every model of fighter aircraft that was in production during the war. About seven years ago, I was invited to his house in England, a very rare occasion for him to have visitors. He had done his homework about me and I was invited for lunch but ended up spending the day with him. He was just an amazing guy."

"Henshaw was absolutely thrilled that we were resurrecting the Spitfire and that we were making it immortal. That's what he said. His words were, 'That we were making it immortal and it would go on.' He said, 'You've done, for all the people that flew and worked on them, a service, in that the Spitfire is still going to live. That's what I'm thrilled with.' And he really was. He said 'In the modern world today, you could not do it any other way. You can't put a Merlin engine in it. You can't build it like the original because the cost is just too much. You have built it the only way that pilots can afford it.'"

When asked if Henshaw ever flew in the MK 26B Spitfire O'Sullivan replied, "No, he never did. He was to fly one but he became very ill just about that time. He wanted to. He definitely did. It's funny because the department of aviation had taken the license off him some years before that. He said, 'I've got to fly one. It will do you good if I can fly one. Can you imagine what it will do?' And I said, 'But Alex, you don't have a license.' 'Damn the license,' he said. 'I don't care about that. At my age, I don't care anything like that!' That's the sort of fellow he was. And he would have but we didn't have an available aircraft in England just at that time. Alex was well into his 90s, so it was just too bad."

So is it a Spitfire? If you ask Mike, he will tell you "Make that decision yourself. Alex did, and I cannot think of a more qualified opinion than his!"

So why the move? Why Cisco, Texas?

After 19 years of successful production in Australia, the decision was tough. I knew I would have to shut down for an extended period and start anew after the move. But, all of the raw materials come from the USA; we were paying shipping twice – once to get it to Australia, and a second time to get it to overseas customers. As a company, we had hit a plateau. Shipping costs were going up and I did not want to raise kit prices. And, 'made in America' sounded good to me. So, we took the plunge."

"Cisco has been great. I knew I had to have full support from the community, and we do. Supermarine Aircraft now resides in a brand new 10,000 sq. foot purposed build hangar on the airport, 3F2. We are just one hour west of the Dallas / Fort Worth area, right on Interstate 20. Perfect. Builder customers often want a factory tour so easy access to an international airport

was important. I also wanted year 'round flying weather, which we have. I encourage pilots to fly in for a tour and a visit!"

So, does this fly like a Spitfire?

For cross country, Mike says that he typically sets the power at an engine RPM of 3200 which delivers about 160 knots indicated at sea level on 9.5 gallons / hour. That is about a 42% power setting. At 60% power setting the aircraft flies at 180 knots IAS sea level and 10.5 GPH. One happy Australia builder told Mike he flies at 200 knots sea level IAS on 13 GPH. The gross weight full of fuel and passengers is 2000 pounds; standard fuel capacity is 37 gallons and long range tanks give 48 gallons total.

The engine is beautifully smooth. The power curve is very progressive and lovely throughout the full speed range. Interesting, the Mk 26B with the LS 2 engine has about the same power to weight ratio as the Mk IX legacy Spitfire. We don't go as fast as the Mk IX, but in climb and turning performance, those who have flown both the Mk IX and the MK 26B say there is an uncanny similarity."

Mike has flown the airplane many times across Australia, going to air displays and says it is very comfortable to fly on long trips.

"You do not set off across the Outback unless you are absolutely sure of reliability – so we took care to build redundancy in the ECU, the fuel system, electrical, gear retraction and extension, all of the critical systems."

"Almost more importantly to me, it had to maneuver and feel like the legacy Spit. Ask anyone lucky enough to fly a Spitfire and the first thing you hear about is the feel, how it flies. Mitchell used the elliptical wing for practical reasons – the thin airfoil section needed enough chord to house the landing gear and the guns. The elliptical shape reduced drag, all very practical. What resulted was one of the great events in aviation – an aircraft that was easy and forgiving to fly while having a sweet feel rarely equaled. Many fighters 'fly on the engine'. The Spitfire 'flies on the wing'. If the engine stops, it's not a bad glider. I had to capture this in the MK 26B; I think I did."

So, what does the future hold?

"We have just about 100 kits in the field, about 40 aircraft flying around the world. The Supermarine business plan calls for limited sales of quick build kits. We meet the FAA certification as an approved 51% experimental, amateur built category aircraft. We have kits available now; we are working out a program to sell the kit in sections to spread out the cost. We did not find a marketing need for a fuselage kit, wing kit, etc. in Australia due to the long shipping distances. In the USA, it is a different story. We are aggressively working on this and will have it out soon."

“Perhaps a lot of war bird enthusiasts don’t realize that the USAAF got ‘reverse lend-lease’ from Britain. Just about 1,000 Spitfires were provided to the Americans and were flown by USAAF pilots. They were used in England, Africa, and Italy. The USAAF also used Spitfires for high speed photo reconnaissance. One of the factory demo aircraft, “High Lady” replicates a specific PR Spitfire. It was the first PR Spitfire over Berlin and was flown by an American.”

“This type of flying isn’t for everyone. I love the fact that every aspect of flying appeals to someone. For the individual that feels the sense of history, the pivotal role the Spitfire played and wants the challenge of a unique aircraft that will preserve history, then perhaps I have the kit for them. Besides, it is just so nice to fly!”