INTRODUCTION
Spitfire Prelude

Inspired by the 1992 London Model Engineering Exhibition to build a rivet-for-rivet replica of the world's most iconic fighter aircraft, the author explains how he prepared the ground for a project that would occupy more than a decade of his spare time.

He describes the painstaking, sometimes frustrating search for reference material; reveals his sources of authentic technical drawings, manuals books and photographs and shares his research experiences, from scouring museum archives and the Internet to accessing the full-sized aircraft.

He also reviews the essential workshop equipment, and the vital importance to the model maker of patience, persistence and perseverance.

His message – in this opening chapter and throughout the book – is that building aircraft models from scratch need not be the exclusive province of an elite few, but is within the capabilities of many competent kit builders.

CHAPTER 1
The cockpit

"It took two years to complete the cockpit, then I built the rest of the model around it!"
David Glen reveals how he recreated in miniature every visible feature of the Spitfire's cluttered cockpit, from its basic structural elements such as frames, longerons and intercostals to the myriad of controls and systems – even down to the electrical wiring.

Major assemblies, including the instrument panel, control column and pilot's seat, are described as models in their own right, together with more general techniques of value to aircraft modeller's everywhere:

- How to form structural sections from printer's plate
- How to create customised dry transfers for the placards and labels
- How to model aircraft instruments where the needles stand proud of the faces
- How to paint and weather the finished parts

CHAPTER 2
Fuselage and cowlings

"The fuselage is made of balsa wood and the cowlings are glass fibre… but most of what the eye can see is metal."
With the cockpit nearing completion, focus switches to developing the balsawood fuselage. Crucial are the upper cockpit walls where the need to reconcile strength with scale poses a major challenge. The chapter takes readers stage-by-stage through the building of

- The pilot's door with its functional hinges and working locking mechanism
- Forming the graceful wing root fairings from thin plywood and balsa
- Cutting and preparing the fibreglass cowlings for metal skinning

CHAPTER 3
Beauty skin deep

“Riveting the skin added a year to the work, but it was time well spent.”
Litho plate is a well-tried material for cladding large aircraft models, yet the author takes the process to new heights. Not only is each panel and inspection plate faithfully represented, the tens of thousands of tiny rivets and screw fasteners are individually emplaced by hand.

In this chapter about metal skinning the fuselage he explains the basic techniques for

- Cutting, drilling and folding litho-plate
- Annealing and forming skin panels
- Coping with compound curvatures
- Bonding the panels and surface finishing, and
- The all-important riveting sequence

CHAPTER 4
Windscreen and canopy

“Many a good model has been spoiled by the clear parts.”
This chapter is about building and glazing the Spitfire’s canopy – a make-or-break feature of the model. Work starts on the relatively simple fixed canopy at the rear then moves on to the windscreen and armoured glass and finally to the sliding hood.

Once again the various detailed sub-assemblies are built part-by-part directly from scaled-down versions of the Supermarine drawings. They include

- The rear view mirror
- Hood latch and canopy release mechanism
- Armour plate
- The leather upholstered pilot’s head restrainer

CHAPTER 5
The mainplanes

“The wings languished part-complete and gathering grime in my workshop… After investing years in the model I had truly run out of steam.”
A chance meeting with the head of the Royal Air Force Museum averts a crisis of confidence. The author explains how he built the elegant elliptical wings from balsa and foam core parts, and how he managed to attach them to the fuselage without compromising scale or accuracy. The chapter deals in depth with:

- Installing and detailing the wheel wells
- Metal skinning the wings and adding surface detail
- Making and fitting the ailerons and lowered flaps
- Navigation lights, gun muzzles and pitot tube
- Frog-eye navigation lights

CHAPTER 6
Landing gear and under-wing sub assemblies

“The single visible feature of the model not made by me is a pair of shop-bought tyres.”
The Spitfire’s wings and fuselage are united at last, marking a watershed in the project and opening the way for other prominent features. The author uses the radiator and oil cooler sub-assemblies to illustrate how subtle three-dimensional shapes can be interpreted accurately in wood and metal from two-dimensional drawings.

Replicating the delicate laminar mesh of the Spitfire’s radiator proves a major challenge, and the eventual solution exemplifies scratch building at its best. Also covered in the chapter are

- Machining and detailing the main landing struts
- Machining the aircraft’s wheels and brake assemblies
- Making and fitting the tail wheel strut and yolk
- Sheet metal work on the wheel strut doors

CHAPTER 7
The Spitfire’s empennage

“You can cut real rib tapes with crimping scissors, but how to do it in a one-fifth scale model?”
Focus switches to the tail plane, where the Spitfire’s elegant lines pose some of the toughest metal working challenges of the entire project.

The author describes the materials and methods used to fabric cover the rudder and elevators, and he shares his own novel solutions for replicating not only crimped rib tapes but also the underlying rib stringing – both features that bring the model to life.

Once again he turns to the Supermarine drawings for the fine detail, from the elevator and rudder actuating linkages and their metal fairings to the tail light assembly, and even the aerial wire attachment and de-icer.

CHAPTER 8
Resin to the rescue

“For some parts of the model resin offered the only practical solution.”
The scratch builder must be prepared to use a wide range of materials to achieve the desired results, and casting resin is one of the most versatile. The author shares what he has learned about pattern and mould making, and describes how he adopted and adapted the techniques to produce some of the most challenging parts of the model, including the propeller blades, exhaust stacks and carburettor air intake.

In putting the finishing touches to the model he further explores the trials and tribulations of the aeronautical researcher, then returns to his workshop to describe:

- Carving the wooden patterns
- Silicone-rubber mould-making
- Painting and its pitfalls
- A successful sequence for weathered exhaust pots

CHAPTER 9
A home at Hendon

“Little did I know that my Spitfire would come to reside in Britain’s most prestigious aviation museum.”
From the chance encounter that determined its destiny to its eventual permanent home at the Royal Air Force Museum, the little Spitfire’s journey to Hendon is a story in its own right: a three-year roller coast ride, veering from the thrill and excitement of helping plan the public display to frustration as successive hitches and delays dogged the project.

With characteristic wit and humour the author describes the agony and the ecstasy, from the model’s months of incarceration in a giant wooden crate to its unveiling in a magnificent made-to-measure glass case.

DIVERSIONS AND DISTRTACTIONS

Over the course of an eleven year project, the model maker sometimes requires some lighter relief: The author reveals a selection of his fine 1/24th scale aircraft models, including examples of his first attempts at scratch building.

THE MODEL MAKER

David Glen ends his story by looking back over a lifetime in which his passion for aviation has found expression as a model maker, private pilot, war-bird restoration volunteer and writer. By reflecting on his childhood in post-war Britain, his uneasy adolescence and a lifelong career in publishing and journalism to a retirement devoted to building exquisite museum models, he seek to answer the question of not how his remarkable Spitfire was built but why.