

Supermarine Type 398 Attacker

Freeware for FS2002

© Ralph Pegram - September 2002

rwp.forward@talk21.com



Isle of Wight Needles and lighthouse, freeware by Nick Ryall – Ukligh1.zip
Farnborough airfield from UK2000pt3 by Gary Summons

Acknowledgements

This aircraft model was built using FSDS Pro (Louis Sinclair), and animated with Aircraft Animator (Konstantin Kukushkin) and SDLEdit (Mike Crosthwaite). Flight dynamics modified using AirEd (William Roth). Texture manipulation with BMP2000 (Martin Wright). Panel built using CFGedit (Ed Struzynski) with gauges modified using gaubzr (Benjamin Chen). Some gauges are repainted, with permission, from Dragonflight Design originals (Dai Griffiths). Many thanks to each of them.

Copyright and Disclaimer

These files are released as Freeware, copyright © Ralph Pegram. The files in this package may be freely copied and distributed, unmodified and complete, provided that they are not used for profit, either singly or collectively, and that no charge is made for their distribution.

All the files are totally harmless but nevertheless you load them at your own risk. No responsibility is accepted should you believe that they have disrupted your PC, or worse.

Notes

If you wish to repaint this model, adapt it for use in CFS2 or make improvements to the flight dynamics please contact me at the e-mail address above for approval, I will also be glad to offer assistance, advice or at least moral support.

Installation

Unzip the contents of type398.zip into your FS2002 main directory (default location C:\Program Files\Microsoft Games\FS2002). The aircraft model, textures, panel and sounds will be loaded in a new folder – Attacker – in the Aircraft directory and the gauges into the Gauges directory.

This model uses both custom gauges, included in the zip file, and standard FS2002 gauges

Model

This aircraft model is of an Attacker FB2 serving with 800 squadron, Royal Navy Fleet Air Arm, deployed aboard HMS Eagle in early 1954.

Panel

The main panel is designed for simplicity and visibility rather than accuracy. Please see later section on flying for details of controls and switches. The main flight instruments, but not the engine instruments, are duplicated in the virtual cockpit. The virtual cockpit may be improved in future updates if information on layout can be found.

Wanted – photographs of Attacker cockpit showing details of panel and instruments. If you have any available please contact me via e-mail

Flying the Attacker in FS2002

Detailed information regarding the handling of the Attacker, other than at take-off and landing, has proven difficult to find so for much of the flight envelope it has been assumed that the handling characteristics would have been similar to high performance piston engine fighters of the same generation, so the

flight model is similar to P-51s, Spitfires and Sea Furies and so on. In general the Attacker was easy to fly but a little unstable in yaw, it was not generally considered to have been a particularly good gun platform. Top speed and climb has been matched to published data, more or less.

Performance

Max speed	sea level	590 mph
	30,000ft	538 mph
Cruising speed		380 mph
Initial rate of climb (sea level)		6,350 ft/min
Time to 30,000ft		6 mins 36 sec
Service ceiling		45,000ft
Range		590 miles
Approach speed (flaps full down, half fuel)		105 kts
Touch down speed		100 kts
Stall (clean, half fuel)		106 kts
	(flaps full down, half fuel)	96 kts

Start up

From the main panel screen follow the start-up sequence indicated in the kneeboard checklist (F10) or consult the *NOTES* (use the switch bottom left of the panel to access these). The engine electrical system and ignition uses FS98 switches by Dai Griffith of Dragonflight Design that appear to function adequately in FS2002. However be aware that changing to the Attacker from another aircraft while in flight may result in the engine cutting out. Most times it is simple to re-start from the main panel but occasionally it may prove difficult to turn the electrics back on, sometimes hitting the L key (lights) a few times will help. A similar effect may occur if you change from full screen to windowed mode.

Take-off

The Attacker accelerates rapidly to unstick speed of 110kts but the tail is slow to rise. It is not normally necessary to use flaps for take-off from standard runways although it may be advisable to use one notch for carrier launch. The aircraft will be slightly nose heavy until cruise speed is reached. If flaps have been used for take-off there will be a noticeable nose down pitch as they retract.

Normal cruise speed is around 350 kts TAS (~ 60% engine power)

Autopilot

The aircraft is fitted with basic autopilot functions that are adequate to allow the pilot to go and make a quick coffee. However it cannot handle high rates of turn or climb so use with caution.

Virtual cockpit

The primary flight instruments are duplicated in the virtual cockpit. A zoom setting of 0.8 is best if you wish to be able to view the entire panel without looking down.

Approach and landing

The Attacker is a relatively clean design and does not lose speed rapidly, which requires a fairly long approach or S turns to slow down. Gear and flaps may be lowered when speed is below 250kts (this is almost certainly higher than would be possible in the real aircraft). The flaps function mainly as airbrakes, hence the high angle of deflection, and cause a pronounced nose up pitch. Best approach speed is 110 kts dropping to 100kts at touch down. With gear and flaps down 110 kts requires about 65% engine revs (8000rpm).

Do not attempt a three-point landing, not only can this result in damage to the tail wheel but in carrier operation would cause problems with the arrestor cables. The long stroke of the main gear oleos is animated.

The tail hook is animated along with the gear as this produced a better result than linking it to the flaps. On touch down the hook will spring back. The downside is that the hook will also extend after take-off and before the gear is retracted, which is not realistic. At present it does not appear to be possible to add hook animation to FSDS aircraft using variables in SLDeedit.

ATC

Air traffic control will recognise you as " Navy - Whisky Kilo 327 ". You will be identified as "Type is Swift ". Neither the pilot nor ATC know their Supermarine aircraft very well, the Swift was a swept wing, re-engined evolution of the Attacker.

History

The Supermarine type 398 Attacker was a 'first generation' British single engine jet fighter and the first jet aircraft to serve aboard the carriers of the Royal Navy. However it saw only limited service, little more than three years, and was essentially obsolete by the time it entered service in 1951.

The specification and design for the Attacker had its origins in the closing years of WWII when priorities lay elsewhere and resources were extremely

limited. Consequently the Attacker is very much a compromise, a mixture of innovation and pragmatism, that resulted in what is possibly a unique aircraft, one that bridges the gap between the pre-war piston engine era and the post war transonic jets. It is strange to consider that there is a perfect unbroken evolutionary lineage between the 340 mph Spitfire prototype of 1935 and the marginally supersonic Swift Mk7 of 1956, with each successive aircraft in the chain inheriting major structural components from its predecessor. The type 398 is the key link as it utilised the wing structure from the Spitfire, itself a straight evolution of the late generation Spitfires, mated to a new fuselage built to house the jet engine.

The first generation UK jet aircraft

In the dark days of the late 1930s and early years of WWII the British Air Ministry was faced with a dilemma, on the one hand it had in service or under construction a series of high performance piston engine fighters, the equal of any in allied or enemy hands, with plenty of potential for further development. While on the other, it found it had access to early jet engines that were proving both more capable and more reliable than most had considered possible. It was clear that the future lay with aircraft powered by these engines but the key question was by when, and how much effort should be diverted to their development under wartime conditions. Under the rigours of war neither the RAF nor the RNAS were particularly enthusiastic in such a radical move and emphasised the need to ensure continuing improvement and delivery of proven conventional aircraft; the logistical problems of introducing a completely new class of aircraft and engine were thought to outweigh the potential advantages of the aircraft themselves. The decision therefore was made to place responsibility for engine and airframe development in the hands of the less overworked sectors of industry, initially Rover (taking over from Whittle's company Power Jets) and Gloster, who together did excellent work with the limited resources granted to them. The 'proof of concept' E28/39 and subsequent Gloster Meteor fighter were both exceptional aircraft/engine combinations that were a credit to those that worked on them.

With the benefit of hindsight it is easy to accuse the services and ministry of a lack of vision, and there was certainly a reactionary faction in key places that did show both a dreadful bias and minimal knowledge, but overall, giving due consideration to the immediacy and critical nature of the war, the decisions made at this time were probably correct. It is most unlikely that increased effort to introduce jet powered aircraft earlier would have had any significant impact on the duration of the war, and the removal of key resources to achieve this, to the detriment of delivery of proven and effective aircraft, could have caused great difficulty to the services. Whether it would have been justified to have funded Whittle's jet engine development work in the early 1930s is another question entirely. In the days of the depression with 200mph biplanes as frontline fighters and monoplanes still regarded as somewhat radical the jet engine no doubt looked like science fiction.

As the war drew to a close, with allied success looking increasingly likely but duration still unknown, a new set of problems arose. The advent of nuclear weaponry, the growing awareness that the Soviet allies had an expansionist agenda that conflicted with the aims of the USA, UK and mainland European nations, and the social disruptions that the ending of war precipitates, all conspired to make future defence requirements and budgets uncertain. Serious errors of judgement were made at this time of which the two most damaging were the release of engines and technology outside the UK and the failure to accept that airframe design had to move forward dramatically to keep in step with the ever expanding capability of the new engines.

In the first case it is understandable, but ultimately commercially damaging, that jet engine technology would be shared with the US. The provisions of lease-lend, whereby the US provided aircraft and engines to the UK during the war, made this inevitable. What is not understandable is why the post-war UK government considered it acceptable for Rolls Royce to provide the Soviet Union with examples of the then state-of-the-art Nene engine. That unlicensed reverse-engineered copies of these should then appear in the Mig 15 was hardly surprising and gave a potential enemy an advantage essentially free of charge.

In the second case the ministry, and the UK aviation industry as a whole, were rather slow to develop new airframe design, in particular swept wing technology. It is not that concept designs did not exist but few were taken forward to model testing and even fewer to actual prototype form. Again this is partly due to a lack of funding and partly to a lack of access to critical technology, such as transonic wind tunnels. Furthermore both services dithered over what their post-war requirements would be and the ministry played its own strange games, such as commissioning and subsequently cancelling the Miles M-52, a jet powered test aircraft designed to break the sound barrier, on the grounds that it was considered unwise to proceed in view of the unknown hazards.

The Supermarine type 392 and 398

In these circumstances it is not really a surprise that the design for the Supermarine type 398 came out the way it did. The original ministry specification was issued in 1944 and was for a single engine fighter using the forthcoming Nene engine, the first design with sufficient thrust for a single engine fighter. The performance required was actually little different from that of the Meteor, at that time soon to enter service. The hard pressed Supermarine staff, developing the late generation Spitfires and preparing the follow on Spiteful design, had little resources left to handle the new requirement. It appeared that an order for the Spiteful, or the naval equivalent the Seafang, was unlikely to be forthcoming, as performance was little better than the later Spitfires, so it was decided that the tender would incorporate the basic Spiteful wing structure, armament and undercarriage fixtures, to save both time and cost. This was to be mated to a simple circular cross-section, cigar shape fuselage enclosing the Nene engine. As a direct consequence of this decision the aircraft a tail wheel design. Supermarine were not alone in

taking this evolutionary rather than innovative approach as Hawker also tendered a design based on their Fury fighter (like the Spiteful looking unlikely to find an order).

In a move so typical of the time the RAF withdrew interest their in the project almost immediately and a new specification was issued in early January for a naval fighter, little different in most respects from the previous requirement. Supermarine again tendered the type 392 with minimal changes whereas Hawker took a step forward with a modified design no longer based on the Fury. After much unreasonable delay both aircraft were eventually ordered.

The type 392 prototype first flew in July 1946, and the Hawker type 1040 in September the same year.

Early testing resulted in a number of modifications. Performance was as specified, courtesy of the excellent Nene engine and clean airframe design, but handling was less than optimal. The laminar flow wing had proven to have aggressive stall characteristics on the Spiteful and required modification. The wing was also moved rearwards and a modified tailplane of increased area was added, along with a fillet on the fin and tabs and balances on the control surfaces. The size and shape of the engine inlets was also revised and subsequent development aircraft were designated as the type 398. All of this work proceed at a painfully slow pace resulting from official dithering. It is worth mentioning that during this period Supermarine were also working on swept wing derivatives of the Attacker, which would lead ultimately to the Swift, and on large twin engine fighter designs for the Navy, both of which looked like better options for the future than the 398.

Initial deck trials with the 398 took place in October 1947 making it the first jet aircraft to land and take-off from a carrier. (the swept wing derivative, the type 510, became the first swept wing aircraft to do the same in Nov 1950)

Finally in September 1948 the Navy placed an order for the type 398, now named as the Attacker. First production aircraft rolled on the line in May 1950 and service entry took place in January 1951.

It is clear that the early lead in engine technology that the UK had enjoyed as a result of Whittle's work, and subsequent development by Rolls Royce and de Havilland, had been lost by the end of the '40s. The various aircraft built to house these early jet engines, both in the UK and elsewhere, were generally rather indifferent as the industry experimented with novel designs. Ultimately the UK was not destined to be a leader and indeed struggled to keep up through to the mid 50s.

The Attacker was never to be tested in combat, but would probably not have been at a serious disadvantage against many of the other jet aircraft in service at that time. While basic and not outstanding in performance it was nevertheless easy to fly and relatively vice less. Most of the first generation jet fighters were broadly similar in performance and only the North American Sabre was truly outstanding.

