

FFVS J 22

— *The Swedish Air Force's
successful WWII “panic fighter”*



Built by

FFV Aerotech

CELSIUS GROUP



The J 22 prototype outside the FFVS assembly hall at Bromma Airport, Stockholm, in September, 1942.

At the outbreak of World War II, orders for 264 modern fighters were placed by Sweden in the United States. Due to an American embargo, only 60 aircraft eventually reached Sweden. Despite huge efforts, no country was willing to sell replacement fighters. Finally, Italy was willing to grant export licenses for fighters, but this was a temporary solution. The planes were neither up to date nor had the required performance.

The Swedish Air Force decided to build the aircraft themselves, in their own workshops. As no licence agreement for any of the desired fighters could be reached, the plane had to be created from scratch – in all respects. There were less than a handful experienced aircraft designers available and the use of strategic materials such as duraluminium was restricted. Finally, there were no suitable facilities for aircraft production. The task seemed impossible at first glance.

Military aviation in Sweden started in 1911, and in 1926 the Royal Swedish Air Force was formed when the Army Air Corps and the Naval Air Service were amalgamated. From the beginning, the new branch of the armed forces was totally overshadowed by the Army and Navy and had to survive on meagre funds.

1936 was a turning point, when the Government decided that the Air Force should be strengthened and modernised. Much effort was put into creating a strong bomber force. Only one wing, F8 in Stockholm, was equipped with fighters; three squadrons of Gloster Gladiator biplanes for defending the capital.

At the outbreak of World War Two, realities forced the Swedish High Command to rethink the role and strength of the Air Force. Hastily, two more fighter wings were decided on. Orders for modern fighters were placed in the United States; 120 Seversky (Republic) P-35s and 144 Vultee 48c Vanguards. Only 60 P-35s had reached Sweden in October 1940 when further deliveries were embargoed

by the American Government. Despite huge efforts, no aircraft could be found to replace the American fighters. Sweden made enquiries both in England and Germany, but only Italy was willing to grant export licenses, so hundreds of aircraft were ordered from the manufacturers *Caproni*, *Fiat* and *Reggiane*. This was a temporary solution, since the planes were neither up to date nor had the required performance.

Due to the earlier doctrines and Air Force policy, the sole Swedish aircraft manufacturer, Saab, was fully occupied with the development and production of bombers.

A fighter, the Saab J 21, was on the drawing-board, but was not expected to enter service earlier than 1945-46.

Do it yourself!

The only way to obtain the much needed fighters was to let the Air Force workshops build the aircraft themselves.

As no licence agreement for any of the desired foreign designs couldn't be reached, the plane had to be created

from scratch – in all respects.

There was a strict order that Saab people were not to be utilised in the Air Force fighter project and there were fewer than a handful of experienced aircraft designers and technicians who were not involved in production at Saab. Also, the use of strategic materials such as duralumin was restricted. Finally, there were no suitable facilities for aircraft production. The task seemed impossible at first glance.

Despite all the obvious problems, the Ministry of Defence gave the “Go Ahead” at the beginning of 1941. The project was christened “J 22”, where J stands for *Jakt* – Swedish for *Fighter*.

Birch plywood and welded steel

Management of the project was entrusted to a talented aeronautical engineer, *Bo Lundberg*, who presented his ideas for a small lightweight fighter of rather unconventional design. J 22 was a mid-wing design comprising a mixture of steel and wood in the main structure. The tubular steel fuselage framework was covered by moulded birch plywood panels. The panels were an integrated part of the loadbearing structure and took a considerable amount of the stress and loadforces.

The wing was built in a similar way with a welded main spar, ribs and ply-covered surfaces. The undercarriage was retracted into the fuselage by a very sophisticated mechanism, thus keeping the wing aerodynamically “clean” and uncomplicated.

Simplicity was the trademark of the J 22, as most of the components were intended to be produced by approximately 500 subcontractors, ranging from small workshops to large industries. For them, it was a challenge since most of them had never previously been confronted with the demands of aircraft building. For example, on the 7-metre long wing spar made by AGA, the tolerance at the tip was just 2 millimetres. A special welding technique was developed to prevent the metal from shrinking and bending due to stress in the welding joints.

The problem of *how* and *where* to establish an assembly plant was solved when ABA, today the Swedish part of Scandinavian Airlines, built a new maintenance hangar at Bromma Airport in Stockholm.

The Air Force Administration leased the hangar “for as long as the war lasted”, and when it ended, ABA took over the hangar for peacetime operations. The name of the works at Bromma was FFVS – *Flygförvaltningens FlygVerkstäder i Stockholm*.

First flight in 1942 – squadron service in 1943

The aim was set to deliver the first production aircraft in mid-1943 after two prototypes had been built and test flown. The design office was established early in 1941, but there was an alarming lack of qualified personnel.

Initially, the more experienced engineers had to teach the newcomers the mysteries of aircraft design in parallel with their own hard pressed work.



▲ At the outbreak of WWII, the sole Swedish fighter wing was equipped with the outdated Gloster Gladiator.



▲ Of 264 fighters ordered from U.S. manufacturers, only 60 Seversky P-35s reached Sweden - the rest being embargoed.

▼ Production of J 22 was inaugurated in an airline maintenance hangar in Stockholm, but was later transferred to custom built facilities in Arboga.



By trial and error most obstacles were overcome, and on September 20 1942, the first prototype took off from Bromma on its maiden flight with Major *Olof Enderlein*, chief of the Air Force Test Centre, at the controls. Series production had actually already begun and in October 1943, the first operational J 22 was delivered to F 9 wing in Gothenburg. During the following two-year period another 197 examples of the fighter were taken onto the strength of the Air Force. By then, production had been transferred to the Air Force establishment in Arboga (now FFVAerotech) where new facilities, including underground bombproof workshops, were built for production, repair and overhaul of J 22s.



In October 1943, the first operational J 22 was delivered to F 9 wing in Gothenburg. Later, the J 22 served in all seven fighter wings that existed in the Swedish Air Force in the latter part of the 1940s.

Periodically, the J 22 served in all seven fighter wings that existed in the Swedish Air force in the latter part of the 1940s. The career of the J 22 ended in 1951 when the last squadron swapped its planes for jet fighters.

Fastest aircraft in Swedish Air Force

When the J 22 was phased into active service, it was the fastest aircraft in the Air Force. The plane was highly appreciated by the pilots for its good habits and manoeuvrability. The J 22 was a straightforward "pilot's aircraft". Also, the technicians liked its uncomplicated, easy to maintain systems.

Even though the J 22 was a primitive aircraft with only basic flight instruments and simple radio equipment, it was the most efficient fighter in the Air Force during the war. Its firepower and manoeuvrability were almost as good as contemporary fighters.

Chasing Mustangs

The J 22 was a pure fighter and had no external hardpoints to carry rockets or bombs. It was a stable gun platform and was very effective in the ground strafing role. The Achilles heel of the J 22 was its relatively poor engine power. However, in a dogfight situation at low altitude, this was to some extent offset by the fast turning rate and high manoeuvrability. In a mock combat with a P-51 Mustang, the J 22 initially climbed faster and at a steeper angle. Below 1.500 metres, the Mustang was outturned horizontally by the J 22, which was able to turn "inside" and get the Mustang's tail in the gunsight. ■



The J 22 today

On June 10, 1990, the restored J 22 "Red K", c/n 22185, was shown to the public for the first time.

Today, three J 22s are preserved in Swedish museums. In 1987, an association of ex-servicemen from the F 10 wing in Ängelholm began to restore the J 22 c/n 22185 that had served with No. 1 squadron of the wing as "Röd Kalle" (Red Kilo). The plane has been deposited by the Air Force Museum and on June 10 1990, it taxied in front of huge crowds of spectators when the F 10 wing celebrated its 50th anniversary. "Röd Kalle" is restored in every detail and is close to airworthy condition. It is a fine monument of Swedish engineering and craftsmanship – a panic solution that became a success!

All texts are written by Peter Billing.
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FFV Aerotech has been an aircraft maintenance specialist since the first decade of powered flight. In 1913, the Swedish Army started an aviation school at Malmen, some ten kilometers west of Linköping. FFV Aerotech can trace its history from these early aviators. Still, aircraft maintenance for the Swedish armed forces is a core business, but numerous other activities make FFV Aerotech of today a technical consultancy resource, worldwide known to armed forces.

FFV Aerotech AB is one of the four members of the JAS Industry Group (IG JAS), currently delivering the JAS 39 Gripen multi-role aircraft to the Swedish Air Force. Here, its commitment includes of every type of apparatus. In the Gripen, this means a total of some 350 different types. FFV Aerotech is responsible for developing service and maintenance equipment, producing maintenance instructions and test programs and planning future maintenance.

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