



The deceptively small Saunders-Roe A.37 flying boat was designed by Knowler as part of a program associated with large flying boat projects. This program began with the A.33 and continued until the P.192 project ended in the mid-1950s. The A.37 was a beautiful, streamlined scale model of a design that never saw the light of day in metal, and embodied the major trends in design and technology developments of the late 1930s.

The A.37, derived from specification R.5/39 issued in March 1939 and known as the "Shrimp", was built in only one copy. Saunders-Roe submitted its design to competition specification R.5/39, which required a large four-engine flying boat to eventually replace the Sunderland. In March 1939, it was decided to build a model of the S.38 to obtain detailed information on aerodynamic and hydrodynamic characteristics. The A.37 was built at the company's own expense as a 1/2 scale model of the S.38. Testing of the proposed A.37 was carried out at the Royal Aircraft Establishment (RAE), followed by a technical design. Development of "Shrimp" was rapid, but by the time it took off at Cowes it was R specification.

The A.37 was used for a variety of missions for which it was not originally intended. Registered in August 1939 as G-AFZS, the aircraft appeared at Cowes in late September and made its first flight in the first half of the following month. The A.37's hull design was metal, with one gear and no water rudder; movement through the water was carried out using a floating anchor, although such a system was used quite rarely. The all-wood cantilever wing had plywood and fabric sheathing. The tail was also made of wood with two endplates and rudders without trim tabs. The Shrimp was powered by four 95 hp Pobjoy Niagara III seven-cylinder air-cooled radial engines, about half the diameter of those designed for the S. 38 modern engines with high performance characteristics. The engines were mounted on steel supporting structures behind the leading edge of the wing and were housed in streamlined hoods, behind which the engine nacelles were located. The A.38 was equipped with fixed underwing floats, which were a copy of the full-size retractable floats that were intended for use on the S.38. Other differences included a two-seat tandem enclosed cockpit and a mooring hatch at the extreme bow of the hull. The boat had the most deceptive appearance: from a distance the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion. The engines were mounted on steel supporting structures behind the leading edge of the wing and were housed in streamlined hoods, behind which the engine nacelles were located. The A.38 was equipped with fixed underwing floats, which were a copy of the full-size retractable floats that were intended for use on the S.38. Other differences included a two-seat tandem enclosed cockpit and a mooring hatch at the extreme bow of the hull. The boat had the most deceptive appearance: from a distance the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion. The engines were mounted on steel supporting structures behind the leading edge of the wing and were housed in streamlined hoods, behind which the engine nacelles were located. The A.38 was equipped with fixed underwing floats, which were a copy of the full-size retractable floats that were intended for use on the S.38. Other differences included a two-seat tandem enclosed cockpit and a mooring hatch at the extreme bow of the hull. The boat had the most deceptive appearance:



from a distance the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion. 38, fixed underwing floats were installed, which were a copy of the full-size retractable floats that were intended for use on the S.38. Other differences included a two-seat tandem enclosed cockpit and a mooring hatch at the extreme bow of the hull. The boat had the most deceptive appearance: from a distance the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion. At a distance, the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion. At a distance, the illusion of a very large flying boat arose, and only up close it became clear how small the A.37 was. The use of four engines naturally increased the illusion.

At the end of 1940 the A.37 was transferred to Beaumaris, Anglesey. The aircraft's activities prior to this date remain unclear and it appears that the aircraft was stored for some time until it entered testing at the Marine Aircraft Experimental Establishment (MAEE) in early 1941. The suspension of the R.5/39 specification noticeably slowed down the development of the program and, in fact, the project team continued to focus on other developments.

Shrimp left Beaumaris early in 1941 for testing at MAEE, which was completed in mid-March. The A.37 was of great use at Helensburgh. "Shrimp" was still unchanged according to the new specification R.14/40, which replaced R.5/39 in July 1940. When changes were eventually made to the aircraft's design, they were made to match the Short Brothers machine.

It was unusual to find a MAEE report that was not merely analytical, as it was enthusiastic about the A.37. Taxiing and handling on the water were found to be excellent, take-off was clean and simple without any drag, there was only a small reaction torque that was easily countered by the rudder. Flight quality was described as very good with light and responsive controls throughout the flight range. The controls were well coordinated and only the slightly heavy rudder was found to be flawed. The only problem was the tendency to stall on the wing when stalled without flaps.

A.37 at Helensburgh. From this angle it is difficult to understand how small the "Shrimp" was and only the size of the cockpit glazing shows the actual dimensions

Despite this success, a full-size version of the A.37 was never built, partly because the procurement team could not decide what it wanted. This was partly due to the emergence of the R.14/40 specification, which in some way reflects this uncertainty. Short Brothers and Saunders-Roe, who competed for the R.14/40 specification, and the Ministry of Aircraft Production (MAP) came to the surprising conclusion that development should be carried out as a joint project between the two companies. The result of this collaboration was the Short/Saro S.35 Shetland - nominally a Short project, but some aspects of the design and construction were credited to Saunders-Roe, as was the use of the "Shrimp" as a research aircraft for the S.35 project. A.

From early 1944 until the late autumn of that year, the A.37 was used at Helensburgh to test various downsized components for Shetland. In February the aircraft was flight tested with a scale Shetland underbody. During takeoff, landing and movement on water, the Shrimp proved to be stable at all positions of the center of gravity, although stability at reduced engine power was slightly less than at full throttle. The tests were useful because although the aerodynamic differences between



the A.37 and the Shetland were too great, from their results it seemed quite likely that the S.35's hull stability would be good.

Following hull testing, the A.37 was fitted with a scaled-down Shetland keel and rudder, as well as S.35 Shetland-style elevators and floats. A new series of tests began in April with an accepted speed range of 70-128 mph (112.63-205.95 km/h). By the first week of July, test results for the scaled-down floats became available. Increasing the surface area of the floats has been found to improve planing performance and reduce splash. The right float showed less buoyancy than the left one and on the water, perhaps due to the torque, turns to the right side were made with less power than in the opposite direction. In crosswinds and seas, the leeward float tended to submerge, resulting in excessive splashing at speeds below 12 knots (22.2 km/h).

Likewise, no negative effects were observed from the new fin, rudder or elevator. Although with the new tail the stability limits remained unchanged, the ratio at the maximum was, with the same tail settings, lower than the original one. The Shetland's tail was more effective at speeds close to takeoff speed. In general, during this period the high qualities of the A.37 were preserved, although it was pointed out that with light aircraft loads, the bottom of the Shetland's hull could leopard on climbs.

Shrimp remained with MAEE until graduation and was returned to Felixstowe in the summer of 1945. There, a converted large-scale Shetland hull bottom was tested, and the test results were collected in December 1946. However, this time the bottom of the hull was modified by adding a 1:15 fairing behind the step and providing forced ventilation for the tail section.

The radome was found to produce harsh bouncing during takeoff and landing and caused a noticeable erratic change in pitch angle at takeoff due to the inability to increase watertightness at maximum amplitude in a certain altitude range. With forced ventilation there was no improvement in landing stability, although with natural ventilation the established stability remained somewhat better. These experiments were soon abandoned, and their goals were not entirely clear, since by this time it became obvious that interest in Shetland had almost disappeared.

The A.37 continued to fly at the Felixstowe-based MAEE until early 1949 when it was scrapped. Although a full-size S.38 was not built, the "Shrimp" proved quite useful, despite the fact that the Shetland was only built in two copies. One of them burned down at the pier, and the second was eventually destroyed. However, the A.37 was one of the best sea-based aircraft ever produced by the Cowes company; he was practically without flaws.