THE SHORT S.45 SEAFORD

Seaford prototype MZ269 displays elegant lines on an early test flight over Rochester. Spinners were later removed permanently to assist engine cooling. Note absence of tail turret. □ Shorts

Originally known as the Sunderland IV, the Seaford, as it came to be called, although similar to its predecessor, was virtually a new design.

By BILL MORTIMER

WITHIN a year of the first flight of the Short Sunderland prototype K4774, on 16 October 1937, and before the type entered service, the Air Ministry was considering a replacement. Even though the Sunderland was a sensational advance on the biplane formula that predominated up to that time, the committee felt that a considerable number of improvements could be incorporated in a new design.

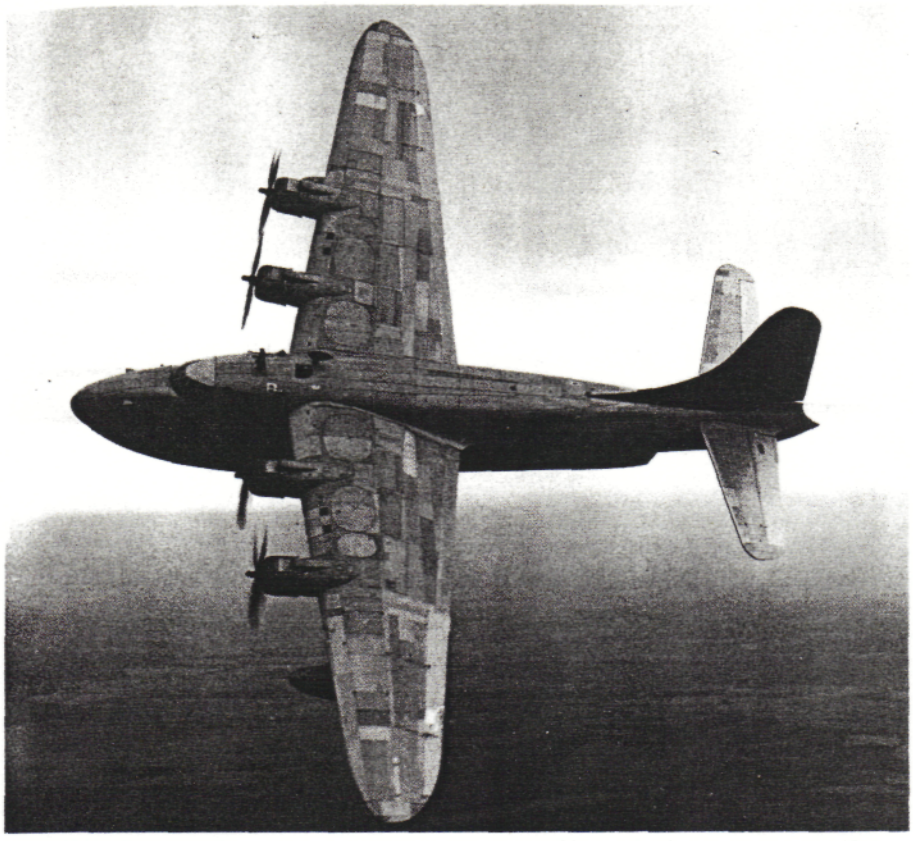
A draft specification for a new flying boat, R3/38, was subsequently drawn up. It included in its requirements an all-up weight of 45,000 lb, a range of 4,000 miles, or 1,500 miles loaded reconnaissance radius, and substantial mid-upper defensive armament. Retractable wing-tip floats were called for, together with mainplane bomb stowage replacing the cumbersome and slow method of stores delivery incorporated in the Sunderland. Considered by the Operational Requirements Committee on 29 July 1938, the specification, representing a streamlined updated Sunderland, was issued to Britain's four major flying-boat manufacturers in the following September.

Initially none of the ideas submitted by Short Bros., Saunders-Roe, Blackburn or Supermarine found favour with the Air Ministry — which continued to insist on a huge mid-upper turret employing 4 x 20 mm cannon, a feature which presented considerable design problems.

A revision of the specification, issued as R5/39, produced an advanced concept from Supermarine embodying retractable floats and main step, and although the design required appreciable development it was decided in August 1939 that it should proceed. (All work on the project was lost when Supermarine's factory at Woolston was bombed in 1940.) In the event, war intervened and a meeting of the Experimental Aircraft Programme Committee on 4 October 1939 agreed that 'the Sunderland design was adequate and could be updated in the normal course of events'. Two months later a further statement was issued to the effect that the Sunderland was 'well able to meet all the requirements likely to be needed during the war'.

By 1941, when Sunderlands of the RAF and Royal Australian Air Force were battling it out with U-boats and the Luftwaffe over the Atlantic, it became evident that improvements to the design were indeed needed. No. 10 Squadron RAAF led the way with local modifications to their Australian Government-owned Sunderlands, fitting 0.5 in guns in waist apertures cut in the hull, together with fixed forward-firing .303 guns in the bow compartment.

Later, having suffered severe reliability problems with 'second-hand' Pegasus XXII engines, and with classic Australian enterprise, 10 Squadron RAAF took matters into their own hands. Using only Squadron resources, one of their Sunderlands, ML839/A, was modified to take Pratt & Whitney R-1830-90 engines. This so improved the overall performance that Short Bros., at the time fully stretched with Stirling and Sunderland III production, were influenced to produce the much improved PW 1830-engined Sunderland Mk V; which was to remain in service with the RAF until 1957, and in various civilian forms until the late 1970s.



G-AHIL 'Salisbury', first of the 'pure' Solents derived from the Seaford shows off the distinctive engine 'toe-out'. □ 'Flight'

In 1942 it was realised that a faster and heavier Sunderland would, after all, be needed especially as the war in the Far East showed every sign of becoming a protracted business.

Specification R.8/42 was issued calling for a more powerful and more heavily armed flying boat to operate at an all-up weight of 75,000 lb. To meet the requirement the Sunderland wing was considerably strengthened to accommodate four Bristol Hercules XVII engines. In addition the hull beam was increased by flared chines and the fore and afterbodies increased in length. The step depth was increased as were the tailplane and elevator areas, the former being given a dihedral to provide added water clearance.

Originally known as the Sunderland IV, the Seaford, as it came to be called, although similar to its predecessor, was virtually a new design.

Strangely, the opportunity was not taken to re-design the distinctive float and engine 'toe-out' which had been embodied in the Sunderland, a feature that came about more by accident than intention. The specification for the Sunderland had called for the installation of a 37mm Coventry Ordnance Works quick-firing cannon in the bow compartment, and a decision (later regretted) to delete this at a late stage of prototype construction seriously affected CG calculations. As some urgency existed at the time it was decided to overcome the problem by sweeping the mainplanes aft by four degrees, through an alteration of the wing root attachments. Moving the CP aft provided a greater CG range. The re-design was accomplished by Short's drawing office staff working non-stop over a weekend, but insufficient time was available to re-align the engines and floats.

The prototype Sunderland IV, MZ269 (shortly after renamed Seaford) was first flown by Short's chief test pilot John Lankester Parker on 30 August 1944. Subsequent flights revealed that the larger propellers fitted to absorb the increased power of the Hercules XIX (100) engines produced an adverse slipstream effect. In consequence the fin and rudder area was increased and a dorsal fin added to improve directional stability and 'engine-out' take-off performance. The combined effect of these design changes produced a somewhat more elegant appearance than that of the Sunderland.

Defensive armament comprised two 0.5 in guns in bow and tail turrets, two 20 mm Hispano cannon in a Bristol B-17 dorsal turret, two forward firing 0.303 Browning guns in the nose decking and two guns in beam positions. Bomb and depth-charge loads were unchanged from the Sunderland. With a maximum speed of 242 mph (155 mph in cruise) and a range of 2,800 miles, the performance and armament mirrored in some respects the requirements of the original R3/38 specification.

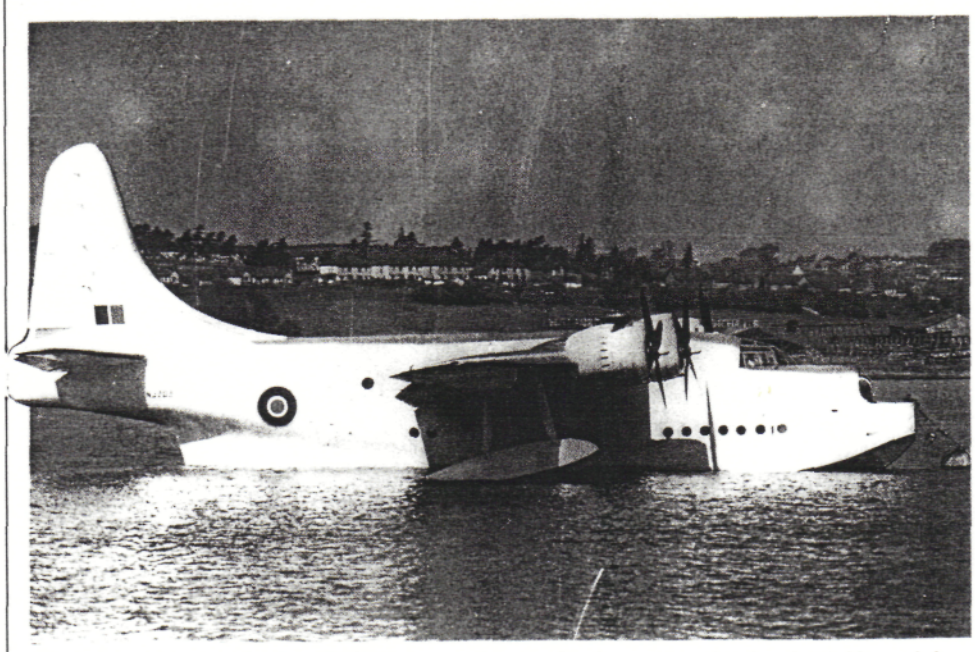
Two prototypes, MZ269 and MZ271, and thirty production Seafords (NJ200-NJ229) had been laid down, and a total of eight completed, before the abrupt termination of the war in the Far East influenced the decisions to cancel the remaining order.

Six of the production Seafords, NJ202-NJ207, were allocated to 201 Squadron for operational trials during April and May 1946 but as their performance was not judged a sufficient improvement over the Sunderland V to warrant entry into Squadron service, they were placed in storage at 57 MU Wig Bay.

From December 1945 until February 1946 the second production aircraft, MJ201, was loaned to BOAC, registered ad G-AGWU, for evaluation as a civil transport. This was followed by a short period of evaluation with RAF Transport Command as an unarmed transport/trainer carrying the code letters OZZA (and still sporting the BOAC Speedbird emblem). For these trials NJ201 was fitted with internal water ballast tanks to simulate varied load carrying.

Transport Command however could not see a viable role for the Seaford, and NJ201, having undergone modification at Short Bros. to streamline the nose and tail sections, but retaining the porthole layout, was allocated to MAEE to investigate problems of resonance in the hull planing bottom on alighting, and spray patterns at high AUW which were causing propeller and tailplane damage. In the meantime BOAC had expressed interest in, and the Ministry of Supply ordered, a purely civilian version of the Seaford fitted

continued overleaf



Fourth production Seaford NJ203 moored in the Medway shortly after initial launch in 1946. □ Ted Symonds

THE SHORT S.45 SEAFORD

. . . continued

with higher powered Bristol Hercules 130 engines and designed to carry 36 passengers over 2,300 miles.

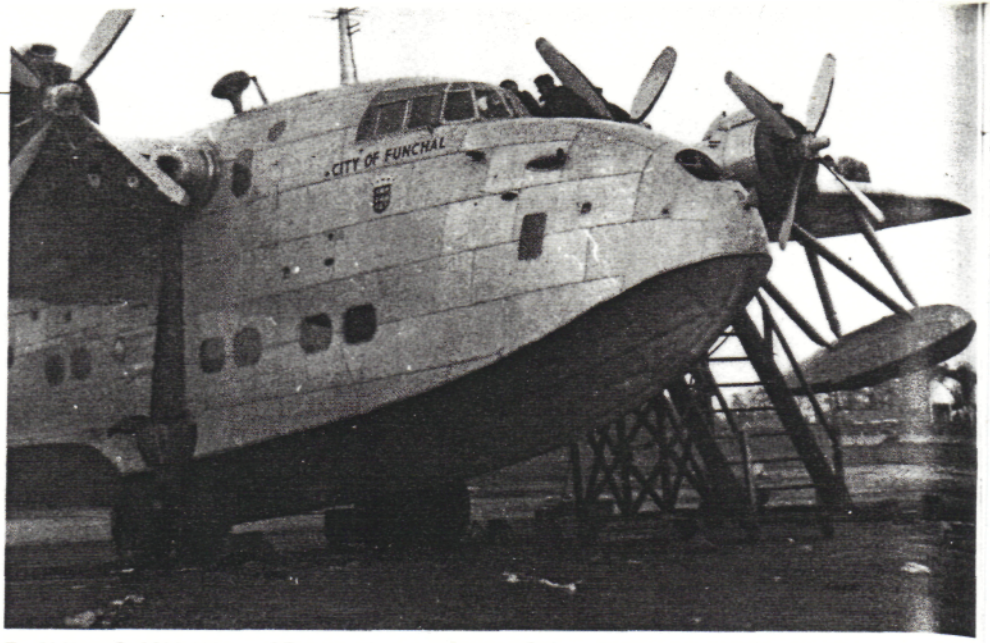
On November 15 1946 the first of the civilianised Seafords, now renamed Solent 2, emerged from Short's Rochester works. Registered G-AHIL and named *Salisbury* in the BOAC fleet it was the first of twelve destined to carry the BOAC flag over the Southampton-South Africa route.

The four degree 'toe-out' of the floats, which in the words of one Captain 'produced an in-built head-wind', had repercussions when a Solent 2 suffered the loss of a starboard float during take-off. Fortuitously a passenger, cine-filming from his seat on the lower deck, recorded the float's departure. Even more fortunately the crew were able to prevent the aircraft capsizing. Analysis of the film showed that the bow wave, impinging on the rear of the float, added to the already considerable side loads caused by the toe-out — with resultant fracture of the rear float strut attachment fitting.

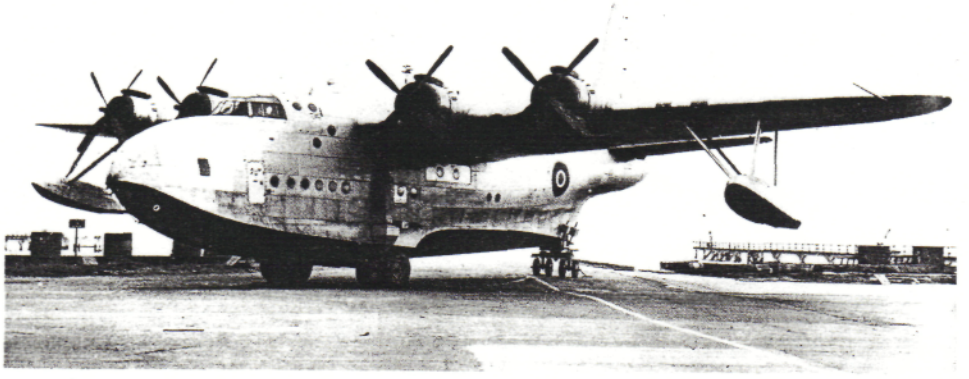
Commencing with NJ201, MAEE's Seaford/Solent, all BOAC's Solents were modified during 1948 to place the floats 5 ft further outboard, aligned fore and aft, and attached via strengthened 'V' struts.

Of the original Seafords the two prototypes MZ269 and MZ271 and the first two production models NJ200 and NJ201 were retained at MAEE Felixstowe. The remainder, NJ202 to NJ207, were subsequently converted, beginning in September 1947, to Solent 3s, fitted with Hercules 637 engines, and joined the BOAC fleet during the following year.

With the demise of BOAC flying boat services on 3 November 1950 all the ex-Seafords and Solents were offered for sale by their owner the Ministry of Civil Aviation.



Ex-NJ201 G-ANAJ 'City of Funchal' converted to Solent 3 standard as Aquila Airways flagship 1954. Note the cockpit canopy configuration unchanged from the original military design. □ Dick Froggatt



Seaford/Solent NJ201 Mgf. Ser. S.1293 displays the revised float attachment struts and positioning at MAEE Felixstowe 1948. □ Bill Mortimer

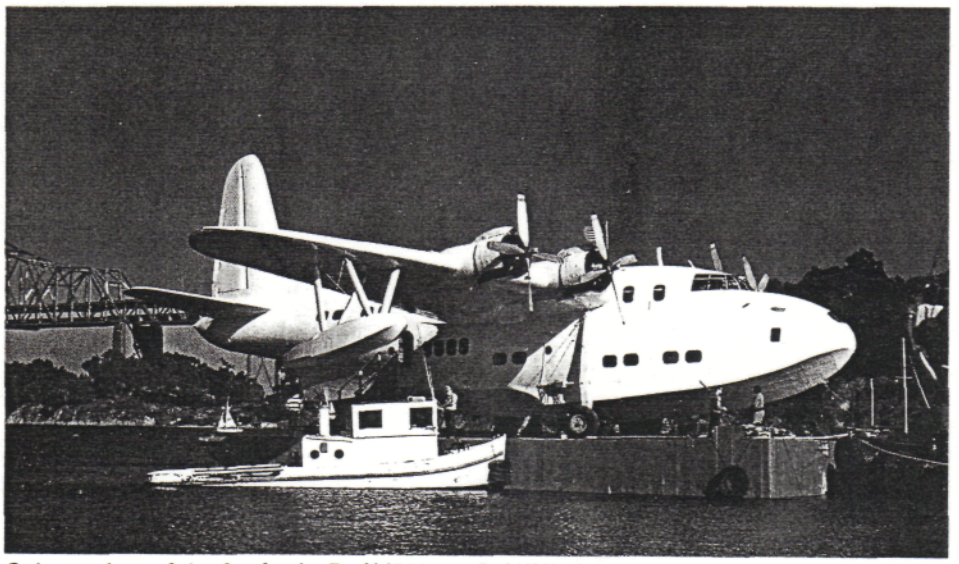
Several flying boat operators took the opportunity to acquire the ex-Seafords, some of which continued in service to the late 1950s. Of the prototypes, MZ269 was written off at MAEE during 1947, but MZ271 remained on the unit's strength until scrapped in 1952. The first two production Seafords, NJ200 and NJ201, were similarly on the strength of MAEE, the latter remaining at Felixstowe until 1953 when it was sold to Barry Aikman's Aquila Airways. Converted to full Solent 3 standard, NJ201 became Aquila's flagship G-ANAJ *City of Funchal* until being wrecked on the beach at Santa Margharita during a storm in 1956.

Aquila Airways also acquired ex-NJ207 G-AKNU *Sydney* which suffered the only fatal accident to any Solent when it crashed in the Isle of Wight on 15 November 1957 with the loss of 35 passengers and the entire crew.

Ex-NJ205, G-AKNS *City of Liverpool* was delivered to MAEE on 7 November 1950 and reverted to the military serial WM759. Retaining the distinctive union flag on the fin it was used extensively to investigate hydrodynamic problems occurring in long swell conditions. It ended its life ignominiously on the beach at Hamworthy in Dorset minus mainplanes, which had been removed in a scheme to join two Solent hulls to create a floating restaurant.

Two of the original Seafords, and Solent G-AHIO *Somerset/City of Edinburgh*, eventually found their way to California where G-AKNT *Singapore*, ex-NJ206, and G-AHIO were finally reduced to scrap in 1974.

Happily ex-NJ203, G-AKNP *City of Cardiff*, now N9946F *Halcyon*, remains intact and has for several years been undergoing extensive restoration by her owner Rick Grant and the 'Friends of *Halcyon*'. It is hoped that her history and current state will be the subject of a future article.



Sole survivor of the Seafords. Ex-NJ203, ex-G-AKNP 'Sutherland/'City of Cardiff', ex Trans Oceanic Airlines VH-TOB, ex South Pacific Airlines N9946, now 'Halcyon' N9446F. Pictured in 1987 being pontooned across San Francisco Bay to a new storage site. □ Rick Grant

SHORT S.45 SEAFORD TECHNICAL DATA

TYPE: Long-range Maritime Reconnaissance Flying Boat (Crew 9-10).
DIMENSIONS: Span, 112 ft 9½ in; Length, 88 ft 6¾ in; Height, 37 ft 3 in; Wing Area, 1,687 sq ft.
WEIGHTS: Empty, 45,000 lb; loaded, 75,000 lb.
POWER PLANTS: Four 1,720 hp Bristol Hercules XIX fourteen-cylinder sleeve-valve radial, air-cooled engines.
PERFORMANCE: Max. speed, 240 mph at sea level, 338 mph at 5,000 ft, normal cruise 155 mph at 5,000 ft. Initial climb rate, 880 ft/min; service ceiling, 14,000 ft; range, 2,800 miles at 155 mph.
ARMAMENT: Two x 0.5 in machine guns in each nose and tail turrets. Two 20 mm cannon in Bristol B-17 dorsal turret. Two fixed forward-firing 0.303 in machine guns. Two 0.5 in beam machine guns. 4,960 lb load of bombs, mines and depth charges.

CIVIL CONVERSION (SOLENT 3)

POWER PLANTS: Four Bristol Hercules 1,690 hp 637 engines.
PAX: 39 passengers on two decks.
PERFORMANCE: Max speed, 236 mph; cruise 200 mph at 10,000 ft. Range, 2,300 miles. Take-off at max AUW 2,700 ft.

Unusual code lettering OZZA on Seaford NJ201 whilst undergoing trials with BOAC at Hythe. Note variety of Sunderland conversions in background. □ Capt Vic Hodgkinson

Sunderland Mk IV prototype MZ269 in the throes of preparation for first flight at Short Bros, Rochester, 1944. Tail turret aperture uncovered and serial number not yet applied. □ Shorts