

Short S.23, S. 30 and S.33

C-class flying boats of

Imperial Airways
Qantas Empire Airways
Tasman Empire Airways
B.O.A.C.

Modelled for Flight Simulator 2004 by

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Short S.23 – 30 – 33 C-class flying boats

Introduction

These famous aircraft formed the backbone of the British national airline, Imperial Airways, and its partners Qantas Empire Airways and Tasman Empire Airways from the mid 'thirties and into World War Two. More modern aircraft replaced the aircraft that survived the war in 1947-48. The C-class also served as the basis of a famous, military flying boat, the Short Sunderland.

The C-class is well documented, so I will not repeat their history or detailed specifications here. The main versions were

S.23	31 examples with Bristol Pegasus Xc engines of 910 HP for takeoff. Fuel load was 600 Imperial gallons and maximum range was 760 miles. A few aircraft had increased range for transatlantic flights.
S.30	9 examples with Bristol Perseus XIIc engines. Fuel load was increased to (normal) 1500 Imperial gallons with a range of 1870 miles, or (extra long range) 2500 Imperial gallons. Some of the aircraft were retrofitted with 1010 HP Pegasus XXII engines.
S.33	The final two C-class boats were like the S.30's, but had from the outset Bristol Pegasus XI or XXII engines

References:

My main sources of reference for preparing this FS2004 model, the textures and the documentation has been:

- H.A. Taylor: 'Saga of the C-class boats', Air Enthusiast eleven, p. 71-80, 1979.

And, for the wartime service of the S.30's:

- Lettice Curtis: BOAC Flying Boats at War, Air Enthusiast forty-three, p. 19 ff, 1991.

Other sources for colour schemes, interior views etc:

- www.imperial-airways.com
- CD-ROM available from www.archivebritain.com: "Imperial Airways (Royal Aeronautical Society Archive Series Vol.3)"
- http://home.austarnet.com.au/reichelt/c_class.html has pictures of each and every C-Class boat.
- <http://www.seawings.co.uk/> - take the walk-round of the Short Empire for some great views!

These URL's were valid may 2004. Other internet sources have also been consulted.

Using the panel

The main panel



The panel is based on a photo and a drawing available at <http://www.seawings.co.uk/> and a description in the 1979 Air Enthusiast article:

The view through the deep, curved screening, with no forward obstructions, was exceptional. All essential controls could be reached by either pilot, with the engine and propeller-pitch controls and slow-running cut-outs worked from a central console, with, above, the Sperry autopilot control panel and the engine switches and starter buttons below the screen. Centrally above the screen were the rudder-bias control, the fore-and-aft trimmer and indicator, the flap switch and the flap-position indicator. As usual in that period, the principal flight instruments were grouped on the captain's panel only, though the first officer's panel included essential basic instruments, such as a turn-and-bank indicator, and he also had in full view the two instruments on the automatic pilot, but his panel was primarily concerned with the monitoring of engine performance. For the record, the captain's flight panel, at least in the earlier C-class boats, included Sperry artificial horizon and directional gyro, a sensitive altimeter, a rate-of-climb indicator and a radio homing indicator, as well as a chronometer and back-up turn and

"liquid" pitch indicators. There were two magnetic compasses mounted to the left and right of the captain and first officer respectively.

The radio officer faced aft at his station behind the captain. His equipment included receivers and transmitters covering the 600-2000-m and 16-75-m bands, and a direction-finding receiver, the loop of which could be retracted or fixed for visual homing on the captain's indicator. On the floor at his side was the auxiliary power unit driving a generator for supplying the electrical services when the main engines were not running and the batteries were not being charged. Equipment in the aft area of the upper deck included the panel of switches and fuses for the lighting circuits, the main fuel cocks, ventilation intake controls and the manually operated cranks for adjusting the engine cooling gills. These were actuated by quick-threads turned by transverse shafts. The gills would normally be open fully for running-up and the inevitably protracted taxiing periods, and closed, or nearly so, for take-off.

I have tried to follow this as far as I could. In the main 2D-panel, I have moved some of the engine gauges (engine no. 1) into the captains' view. The overhead panel includes the light switches as well as the flap- and trim indicators. The basic radio tuners for COM1 and ADF have also been added to the main panel.

The autopilot is that of the FS2004 Douglas DC-3, and is very like the Sperry autopilot used by the C-class flying boats. You can find instructions in the FS2004 Learning Centre, look for the DC-3 under 'Aircraft Information', and open the Flight Notes.

If you use the virtual cockpit, you can see an almost complete set of engine gauges (RPM, Boost, Oil pressure etc) by looking around. You have more options from the 2D panel by calling up the auxiliary panels described below.

Auxiliary panels

SHIFT+2: Engine panel.

- Boost and RPM gauges for all four engines.
- A throttle quadrant for individual engine control.
- Feathering gauges for the four propellers.

Procedure in case of engine failure:

(Note: Engine failures only occur if you ask for them, select Aircraft/Failures in the FS menu)



1. Press SHIFT+2 to call up the engine panel.
2. Select the engine that has failed by pressing E1 for engine 1, E2 for engine 2 etc.
3. Reduce the throttle of the failed engine to 0
4. Feather the propeller of the failed engine by clicking the appropriate feathering gauge
5. Turn off the failed engine by turning its magnetos OFF
6. Select the three working engines by pressing E234 (if engine 1 has failed), E134 if engine 2 has failed, etc.
7. Check that everything is OK by moving the throttle. Only the working engines should react.

SHIFT+3: ADF Tuner.

You have more control of the ADF tuner from here, and the radio compass gives you more information than the homing indicator on the main panel.



The next two aux. panels are cheats, in the sense that GPS, VOR and DME navigation did not exist in the 1930's.

SHIFT+4: The GPS map

You can use the GPS as a convenient real-time map, not for automatic navigation. Think of the GPS window as a substitute for the maps and instructions you would get from your second pilot and the radio operator.

SHIFT+5: VOR / DME navigation

Today, in many parts of the world, NDBs for long-range ADF navigation are far between or non-existent, so you may want to use VOR/DME navigation instead.

Flying instructions

This information is available during your flight, just press F10 to call up the electronic kneeboard, and select the reference tab.

Before Takeoff

- Elevator trim 1 division up.
- Flaps 1 stage down (2 steps for S.30/33 at full load)
- Navigation lights on. By night: Panel lights on.



Takeoff and initial climb

Full throttle and RPM. Takeoff is easy at approx. 110 mph (100 kts).

When safely airborne reduce boost to 3 psi and RPM to 2350. Let the aircraft accelerate to 125-130 mph (110-115 kts) and begin to climb, initially at 950 fpm, or 600 fpm for a fully loaded S.30.



En route climb

Reduce boost to 2.5 psi, 2350 RPM.

Cruise

Boost between 0 psi (economical cruise) and 2 psi (fast cruise), 2200 RPM for S.23, 2350 RPM for S 30 at full load. Reduce RPM as fuel burns off to keep the speed constant.

The normal cruising speed is about 165 mph true airspeed , or an indicated airspeed of about 150 mph / 130 kts at 5500 ft.

The service ceiling of the Short 'boats was about 20000 ft, but if you carry passengers do not exceed 12000 ft. for more than 30 minutes at a time. The cabin is not pressurized.



Descent and landing

Flight Simulator includes airports for seaplanes in some parts of the world (particularly in the U.S.A.), but elsewhere you are on your own when landing. Reduce altitude to 1000 ft, and find a suitable place for landing against the wind. Taxi to the shore to let the passengers out. (Press SHIFT +E and SHIFT +E+2 to open the doors, CTRL+SHIFT+F1 to shut the engines down)

Suggested flights

Imperial Airways and its successor B.O.A.C. used Southampton as the base for its flying boat services to southern Europe, the Middle East, India, Australia and the African route to South Africa. The eastern service was operated in corporation with Qantas Empire Airways of Australia and, later, Tasman Empire Airways (TEAL) of New Zealand.

The European sectors of the route was Southampton-Marseilles-Rome-Brindisi-Athens and from there to Alexandria, Egypt. The eastern route was Alexandria- Karachi-Calcutta-Singapore-Darwin-Sydney, and from Sidney to Auckland, with more stops along the way.

You can fly this route with any of the Empire Boat versions, except the Sydney-Auckland stage, which will require one of the medium-range S.30's of TEAL.

The following flights require one of the long-range versions (or you can cheat by refilling the fuel tanks as necessary):

Transatlantic services with long-range S.23's and S.30's took off from Foynes Harbour near Shannon airport, Ireland. In the summer, the stages were Foynes – Botwood (Newfoundland) – Montreal – New York. The intention was to develop a southern winter route over Lisbon – the Azores – Bermuda – New York, but only the Bermuda-New York service was flown on a regular basis from June 1937 onwards, in cooperation with Pan American Airways.

On the transatlantic service, the S.30's could benefit from in-flight refuelling, making it possible to carry a larger payload.

Creating a flying boat flight in Flight Simulator.

FS2004 includes some airports for seaplanes, mostly in the USA, but to recreate authentic Short Empire flights in other parts of the world, you can do as follows:

- 1) Find the ordinary airports closest to your point of departure and your destination. Use the flight planner to create a VFR flight plan, and save it.
- 2) Say 'yes' to let FS2004 move your aircraft to the selected departure airport. This will put your flying boat on the concrete runway!
- 3) Open map view (select the map icon on the panel, or press ALT+W+M). Move your aircraft to the water using the mouse. Set the altitude to 0 ft (if you take off from sea level, otherwise this step may require some experimenting!)
- 4) You are ready to taxi and takoff! Save the flight if you plan to use that point of departure another time.

