

COMMERCIAL AIRCRAFT SURVEY . . .

1960 that Boeing finally got sufficient orders (40 each by United and Eastern) for a go-ahead. The 727 first flew on February 9, 1963 (a year after the Trident had made its first flight), and entered service on February 1, 1964.

The 727 is produced in four versions: -100 (the original 119-seat 160,000lb gross-weight aircraft); the 727C cargo version with 86in x 134in side door and stronger floor and undercarriage; the 727QC, similar to the C but with folding hat racks and palletised seating for quick-change between passenger and freight carrying; and the 727-200 with a 20ft longer fuselage for up to 166 seats on short-hauls (see Short Haul Aircraft, page 853 of this survey).

Boeing has studied many ways of simultaneously increasing the size and range of the 727, but the changes would be too fundamental, and the end result not particularly competitive with the DC-10 and 1011. As with the 707, Boeing has discovered that it is not sensible to stretch the aircraft beyond the point where development was conceived in the basic design. Before long there will be some very good written-down 727s on the market when the new large capacity trijets take-over the trunk routes. Although the market for new 727s may be at last starting to dry up, the type has very many years of low-cost and highly competitive service still to come.

Boeing 727-100 Orders: All Nippon, 8; American Airlines, 58; Ansett-ANA, 4; Avianca, 4; Braniff, 6; BWIA, 3; China Air, 2; Eastern, 50; Faucett, 1; FAA, 1; Frontier, 5; Iran Air, 4; Japan Air Lines, 12; Japan Domestic, 2; LAN-Chile, 2; Lufthansa, 16; Mexicana, 3; National 13; Northeast, 8; Northwest, 20; Pacific, 3; Pacific Southwest, 8; Pan American, 21; Piedmont, 1; Sabena, 2; South African, 6; TAP, 3; Transair-Sweden, 2; Trans Australia Airlines, 4; Trans World Airlines, 27; United Air Lines, 88; Wardair, 1; Total, 388.

Boeing 727C/QC Orders: Air Asia, 2; Airlift International, 4; Alaska, 3; American Flyers, 2; Ariana, 1; Braniff, 18; China Air, 1; Continental, 1; Eastern, 25; Executive Jet Aviation, 2; Icelandair, 1; LAN-Chile, 2; Lufthansa, 11; Northwest, 12; Pan American, 6; Piedmont, 1; Sabena, 3; South African, 1; Southern Air Transport, 1; TAP, 2; Transair, 1; Trans Caribbean, 1; Trans International, 2; Trans World Airlines, 8; United Air Lines, 38; World, 6. Total, 155.

Hawker Siddeley Trident 1E and 2E It was a 1956 specification by BEA for a short-range jet that gave birth to the Trident (now known as the Trident 1C—see pages 852-859). Three engines were chosen instead of two for greater operational flexibility and, in particular, to preserve the triplicated system philosophy that formed the basis of the most outstanding feature of the aircraft—the incorporation of the world's first fully monitored and protected automatic landing equipment. However, the original aircraft was cut extremely closely to BEA's requirement for the very short inter-city routes of Western Europe and the aircraft did not fit any other important market very well. Neither did the triple-engined philosophy altogether yield the operational flexibility expected, and the operating cost penalties of three engines put the Trident at a disadvantage in relation to larger twins.

However, improvements were made to the wing high-lift devices, the permitted operating weights were increased, more powerful versions of the Spey came along and the Trident 1E medium-range aircraft was developed and attracted a handful of orders.

The Trident 1E has more elaborate high-lift devices on a bigger span wing, and higher permitted operating weights. The



Above, Lockheed-Georgia L-100-20. Below, Sud-Aviation Caravelle 11R



more powerful Rolls-Royce Spey 511, which was initiated for the developed BAC One-Eleven completed the changes to enhance performance. The interior was also rearranged to give more seating capacity without increasing the overall dimensions of the fuselage. The Trident 1E first flew in November 1964, a C of A was granted in September 1965, and first services by (Iraqi Airways) were on October 1, 1965.

On August 26, 1965, BEA finally defined the specification for a repeat-order Trident, and signed a contract for 15 Trident 2Es plus an option on ten more. BEA wanted an aircraft to fly Beirut-London with 90 passengers. The Rolls-Royce Spey RB.162-25 (512W) developing 11,930lb thrust was chosen, and the aircraft gross weight was increased to 143,500lb. The fuselage dimensions are essentially unchanged from those of the 1E and the seating capacity remains at 132 maximum. To achieve the extra range specified, the 2E has an integral fuel tank in the fin and a considerable aerodynamic clean-up. The first 2E flew in July 1967 and deliveries to BEA started in June 1968.

Trident 1E Orders: Iraqi Airways, 3; Pakistan International, 4; Kuwait, 3; Channel, 5. Total, 15.

Trident 2E Orders: BEA, 15.

Lockheed L-100-20 Hercules dates from a 1961 US military requirement for a medium-range general-purpose freighter. With nearly 1,000 of the type now on order for the US and overseas military forces, the type is also starting to find application on the civil market by virtue of its ability to carry the standard 8ft x 8ft road/rail container. It is highly likely that the demand for the L-100-20 will increase as air freight becomes more mechanised in the use of containers.

It was early last year that Lockheed announced the L-100-20 with a 100in longer fuselage than the basic L-100. The first -20 flew early this year and is in service. Several existing operators plan to trade in their L-100 for modification.

L-100 Hercules Orders: Alaska Airlines, 3; Delta 3; Pacific Western, 1; Zambian Air Cargos, 4; PIA, 2. Total, 13.

Sud-Aviation Caravelle The decision to build the Caravelle was taken in January 1953 after a design competition; a French Government contract was awarded in July 1953, and the first Caravelle flew in May 1955. Air France signed an initial order for 12 in February 1956, and the national carrier inaugurated scheduled services with the type in May 1959.

All the original Caravelle Is and IAs were converted to Caravelle III standard having the Avon Mk 527 with noise suppressors. The gross weights were also increased. This basic version is still available to order. The Caravelle VIN has more power and higher weights to give an all-round performance gain over the III—the earlier type can be converted. The Caravelle VIR is slightly heavier and Avon 533R with reverse thrust in place of the emergency brake parachute of the earlier types. The VIR was originally engineered for United Air Lines.

By substituting the Pratt & Whitney JT8D-1 for the Avon Mk 533R in the VIR, Sud was able to show a worthwhile improvement in payload-range and airfield performance, but at the expense of some 20kt in cruising speed. The Caravelle 10R first flew in January 1965 and was certificated in July 1965. The flat-rated JT8D-7 is an alternative powerplant. The Caravelle 11R is the mixed-traffic version of the 10R.

The Super Caravelle first flew on March 3, 1964. To improve all-round performance and take advantage of the increased power of the two Pratt & Whitney JT8D-1 turbofan engines of 14,000lb thrust chosen for the type, a wing-root leading edge extension, revised wing/fuselage junction fairing, a fin-tailplane intersection bullet and a bigger tailplane, were incorporated to permit an increase in the M_{NO} from 0.77 to 0.81.

Caravelle III Orders: Air France, 46; SAS, 21; Swissair, 8; Varig, 2; Finnair, 4; Air Algerie, 4; Royal Air Maroc, 4; Tunis Air, 3; GLAM, 1; LTU, 1; Aer Inter, 7.

Caravelle VIN Orders: Air Algerie, 2; Alitalia, 21; Sabena, 10; Aerolineas Argentinas, 4; JAT, 6; MEA, 3; IAC, 9.

Caravelle VIR Orders: United Air Lines, 20; Iberia, 12; Panair do Brazil, 4; TAP, 3; Cruzeiro do Sul, 4; Austrian Airlines, 5; Garrett, 1; LAN-Chile, 3; Kingdom of Libya Airlines, 3.

Caravelle 10R Orders: LTU, 2; Royal Jordanian Airlines, 3; UTA, 2; Iberia, 7.

Caravelle 11R Orders: Air Afrique, 2; Air Congo, 2.

Super Caravelle Orders: Finnair, 8; Sterling Airways, 7; Syrian Arab Airlines, 2.

Tupolev Tu-154 The first flight of the Tu-154 prototype is imminent. This medium-haul 164-seater trijet has similar proportions to the half-size Tu-134 twin. Stretched versions of the aircraft are planned for over 200 seats. There is also considerable range-stretch in the basic layout and one-stop trans-Siberian operation is visualised. It is a bigger aircraft than even the Boeing 727-200 and the estimates indicate an outstandingly promising performance.