that for the 757 in Renton, and the 767 group up the road at Everett.
A short-haul airliner like 757 spends a lot of each flight climbing and descending, and the cruise is comparatively short. Boeing calcu-lates that climb consumes 60 per cent of the fuel that a 757 would use on a 500 n.m. trip—an important influence on design.
The 757 wing uses more or less the same aerofoil section as the 767, ex-cept that it is smaller in size and is thinner where it joins the narrowbody fuselage. The Boeing section is aft-loaded, with a comparatively flat top, and a small undersurface cusp to-wards the trailing edge (an aft-loaded wing is essentially the same as a supercritical one). Benefits include delayed Mach drag-rise, less wing sweep, and an efficient wing structure. Both new Boeings are designed for a Mach 0-8 cruise, but the 757 has significantly less wing sweep (25° com-pared with 31-5°). The lower sweep can be tolerated without much drag penalty because of the 757's lower average speed. It also allows Boeing to dispense with the complexity of in-board ailerons (the wing is stiffer, raising aileron-reversal speed).
Like its sister, the 757 has a generous wing, the root of which is particularly wide. This arrangement eases accommodation of the under-carriage, and a side benefit is margin for stretched versions. The 757 wing-span is also larger than that of the 727, which reduces induced drag. Shorter sectors allow the 757 to make use of sophisticated high-lift devices, without cruise-drag penalty. The result is double-slotted flaps operated by a track and carriage, plus full-span slats. The 767 also has full-span slats, but employs a simpler flap linkage, and only the inboard surfaces are double-slotted.

Two engines are natural in the drive for fuel efficiency, and it makes sense to relieve bending moment by hanging them on the wing. The adop-tion of a low tail also follows 767 practice. It allows the aircraft to be kept shorter for a given passenger load, and eliminates the chance of in-effective pitch control at nose-up attitudes.
As with the 767, the airframe de-sign goal is 50,000 flights, equivalent to about 20' years of service. Struc-tural philosophy is also similar for the two types, with Boeing preferring the built-up approach to Europe's emphasis on integrally machined parts.
About 35-40 per cent of the 757 was created by computer aided design (CAD), used mainly as a draughting aid. Boeing's first major use of CAD was in the 767, which used a similar amount although less was originally intended.
Systems commonality between the
757 and 767 includes air conditioners, auxiliary power unit, the electrical power system, and hydraulic parts.

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Top Payload-range, assuming a long range step-cruise and standard day. Centre Take-off
performance at sea /eve/ and 29°C, assuming a load of I78 passengers and long range step-cruise.
Above Landing requirement at sea level. All performance data is for the 757 four-door version
(see cutaway), and is based on US domestic rules. The alternative version has three doors and two
overwing exits on each side of the fuselage

FLIGHT International, 2 January 1982 15