

# GE90



## The most powerful aircraft engine in civil aviation

Partnership: General Electric (USA), Avio (Italy), IHI (Japan) and Snecma (France).

Some of the airlines currently using GE90 engines are Air France, China Southern, Continental Airlines, Saudi Arabian, Aeroflot, British Airways, Kuwait, Lauda Air, KLM, Alitalia, Japan Airlines, Varig, Vietnam, Pakistan, ANA, Emirates, Ethihad and AeroMexico.



### The GE90 programme

The GE90 is a turbofan engine family General Electric conceived to cover a thrust range from 76 Klb up to 115 Klb for new twin-engine widebody aircraft like the Boeing 777.

In December 2009, Avio celebrated the 1,000th engine in 15 years of production, an important milestone reached with GE and all the partner companies.

The first version of the GE90 was certified at a thrust level of 76-85 Klb, and entered into service on the Boeing 777 at the end of 1995.

Following the evolution of the Boeing 777, a growth version of the GE90 was certified at 92 Klb thrust in July 1996. A further improved version of the GE90, featuring a 3D aero high pressure compressor, was certified at 94 Klb thrust in June 2000.

The latest growth version of the new GE90-115B, the exclusive power plant for the Boeing

777-200LR and Boeing 777-300ER, was certified on 30 July 2003. The first GE90-115B engine ran in November 2002. During the test, it demonstrated the highest thrust level ever achieved by an aircraft engine (117,446 lb steady-state conditions and 120,316 lb transient conditions). The first aircraft (Boeing 777-300ER) powered by the GE90-115B engine entered into service on 10 May 2004, as part of the Air France fleet.

As of December 2009, the Status of the GE90 Fleet was the following:

ENGINE FLIGHT HOURS (Base / 115B):  
12,663,031 / 5,526,067  
ENGINE FLIGHT CYCLES (Base / 115B):  
2,281,160 / 750,793  
FLEET LEADER ENGINES (Base / 115B):  
53,701 / 25,808 hours 12,166 / 3,678 cycles.



*Propulsion in the sky, space and sea*

## Avio for the GE90

Avio is a partner in the GE90 programme and is responsible for the design and manufacture of the:

### Accessory Drive Train (ADT)

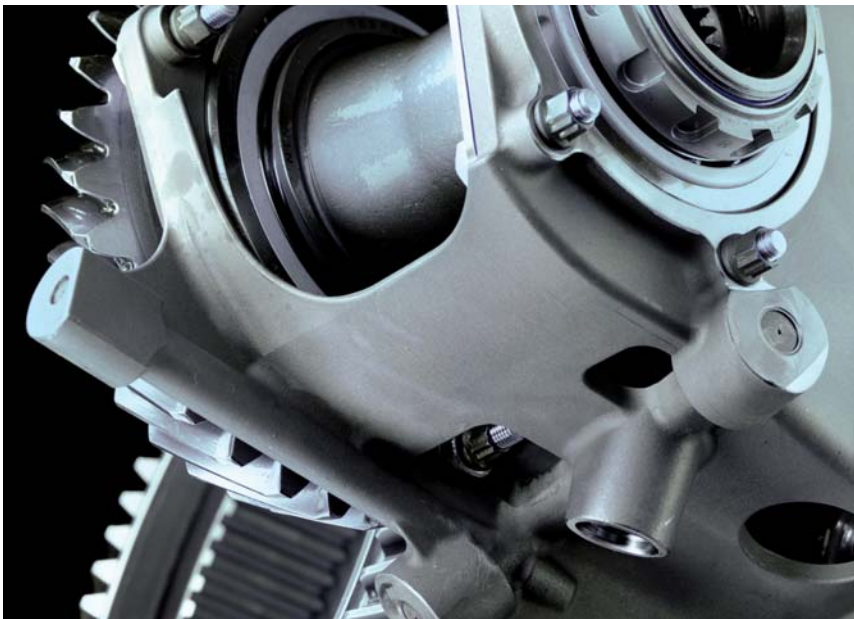
This mechanical system consists of:

- the Accessory Gearbox (AGB), installed under the core of the engine, to provide power to both engine and aircraft accessories in running condition, and to transfer power through the starter device to the engine in start condition
- the Inlet Gearbox (IGB), Transfer Gearbox (TGB) and Horizontal and Radial Shafts (HS and RS) that mechanically connect the AGB to the engine

The accessories installed on the AGB are:

- pressure and scavenge pumps
- fuel pump
- engine starter device
- hydraulic pump
- main and auxiliary electrical generator for aircraft services and electrical generator for engine control

The ADT is designed to support about 700 HP. Avio is a qualified repair station to perform complete overhaul and/or specific approved repairs on ADT gearboxes.



### Low-Pressure Turbine (LPT) components

The LPT module provides the power to drive the compressor and then the accessories through the ADT. It accomplishes this function by extracting energy from the hot gases released from the combustion system and allowing them to expand to a lower pressure and temperature. To produce the driving torque, the turbine consists of several stages of stationary nozzles and moving blades that transfer torque to turbine rotating disks. The GE90 LPT consists of 6 stages, and Avio's contribution to the LPT is the design and manufacture of both static (stage 2 to 6 nozzles) and rotating components (stage 6 blade and disk).



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