DOCUMENT
GSM-AUS-ATP.018

DOCUMENT TITLE

GAS TURBINE ENGINES (CASA ATPL)

CHAPTER 12 – TERMS AND DEFINITIONS

Version 2.0
June 2014

CONTENTS .....PAGE

INTRODUCTION

This chapter contains a list of some of the more common terms and definitions used in this text and the aviation industry in general. It is meant to be a guide only and is by no means a comprehensive list.

ALPHABETIC LISTING

Adiabatic Lapse Rate — A change in temperature due solely to change in pressure, with no loss of heat energy to, or gain from, the immediate surroundings. It is approximately two degrees per 1000 ft.

Air Intake — The intake at the front of the engine, through which air is admitted to the compressor.

Alpha Range — The turboprop flight range.

Annular Space — The air gap between the combustion chamber outer casing and the flame tube.

Axial Flow Compressor — A compressor section with alternate rows of rotating and fixed blades which are radially mounted. The flow of gas through the compressor is an axial flow.

Ball Bearing — A main shaft (spool) bearing, that uses spherical balls as rolling elements to transmit radial and axial loads.

Beta Range — The turboprop ground range.

Bleed Air — A supply of air from the intermediate and high pressure compressor stages. Used to supply the air conditioning, pressurisation and anti icing systems. Bleed air can also be supplied from the APU.

Bleed Valves — Are fitted adjacent to the intermediate and high pressure compressor stages to unload the compressor to help prevent the compressor from stalling (controlled by the FADEC). They are also used during the start cycle.

Brayton Cycle	A continuous four stroke cycle, which describes how a gas turbine engine works.
Burner	The nozzle which injects spray of fuel into the combustion chamber. It can also be referred to as a spray nozzle or fuel atomizer.
By-pass Engine	An engine in which an amount of air is directed to the hot section of the engine, with the remainder being ducted to the atmosphere after passing through the LP compressor.
By-pass Ratio	The ratio of air by-passing the engine core to the air entering the core.
Calorific Value	The calorific value of a fuel is the quantity of heat produced by its combustion at a constant pressure and under "normal" ("standard") conditions.
Centrifugal Compressor	A compressor which uses a rotating impeller to cause a pressure rise by centrifugal force.
Combustion Chamber	The engine stage which includes the flame tube, in which combustion takes place.
Compressor Spool	A complete compressor section consisting of one, or a number of stages.
Compressor Stage	An individual row of rotating compressor blades and a row of stationary stator blades.
Cascade Vanes	A set of vanes fitted in the by-pass duct on a high by-pass turbofan, used for reverse thrust.
Combustion Chamber Drain	A valve fitted to the combustion chamber allowing excess fuel to drain out of the chamber during starting.
Compression Ratio	The ratio of compressor outlet pressure to compressor inlet pressure.

Diffuser	A divergent duct, fitted between the compressor and the combustion chamber. Used to slow the velocity and increase the pressure of the gas flow.
ECAM	Engine Centralised Aircraft Monitoring, used by Airbus.
EICAS	Engine Instrument and Crew Alerting System, used by Boeing
Electronic Engine Control (EEC)	An Electronic Engine Control interface used before the FADEC was introduced.
Engine Core	The airflow of the turbofan engine, minus the by-pass air. The core air is used for combustion.
Engine Pressure Ratio	EPR is the ratio of exhaust pressure to intake pressure and is used to measure engine performance.
ETOPS	ETOPS is an acronym for extended operations. This rule allows twin engine airliners to fly long distance routes that were previously off limits. ETOPS operation has no direct correlation to water or distance over water. It refers to single engine flight times between diversion airfields, regardless as to whether such fields are separated by water or land.
Exhaust Cone	A cone which produces a divergent passage in the early exhaust section and allows a relatively low gas flow velocity. Also protects final turbine stage from overheating.
EGT	Exhaust Gas Temperature is measured after the gas has passed through the turbine.
Flame Tube	A tube inside the combustion chamber, in which the fuel and air are mixed and combustion occurs.
FADEC	Full Authority Digital Electronic Control, a computer interface between the pilot and the engine, replaces the EEC and FCU.

Fuel Manifold	A main pipe with a series of branch pipes which distributes fuel to the individual spray nozzles.
FCU	The fuel flow control unit, which incorporates all the components which regulate the fuel delivery to the engine. These were superseded by the introduction of the FADEC.
Fuel Specific Gravity	S.G. is ratio of the weight (density) of fuel to the weight of pure water at a given temperature.
H.E. Unit	High energy starting unit
HP Fuel Cock	To control the high pressure fuel flow from FCU to the fuel manifold
ISA	International Standard Atmosphere is 15 degrees Celsius and 1013 milli bars at sea level.
ITT	Inter Turbine Temperature measures the gas temperature in between turbine stages.
JPT	Jet Pipe Temperature is the temperature in the exhaust pipe. This is the same as EGT, but the term rarely used today.
Mass Flow	The weight of the airflow passing through the engine per unit of time, then adjusted for the effects of gravity.
Momentum Drag	The drag produced by the intake when directing air into the compressor (work being done).This is necessary to maintain a stable operating condition.
MSL	Mean Sea Level, is the average height of the ocean surface.
NGV	Nozzle Guide Vanes are convergent ducts that direct air onto the turbine wheels.

Petal Reversers	Sometimes called Blocker Doors, act the same as cascade vanes, with the added bonus of a speed brake.
Primary Airflow	Used to describe the 20% to 25% of airflow that is mixed with the fuel in the combustion chamber.
Propulsive Efficiency	This is the efficiency, in percent, with which the energy contained in a vehicle's propellant is converted into useful energy, to replace losses due to air drag, gravity, and acceleration. It can also be stated as the proportion of the mechanical energy actually used to propel the aircraft.
Ram Effect	The increase in mass airflow due to the forward velocity of the aircraft.
Roller Bearing	Uses cylinders as rolling elements. Can only transmit radial loads.
Secondary Air Flow	The 75% to 80% of airflow that is used for cooling and dilution purposes in the combustion chamber.
SFC	Specific Fuel Consumption is used to describe the efficiency of a turboprop. It measures the amount of fuel in pounds to produce one SHP.
Shear Shaft	A drive shaft designed to break if an accessory malfunctions, thus preventing accessory case damage.
Spool	A single compressor and turbine linked by a shaft.
Stoichometric Mixture	The 15 to 1 air /fuel ratio used in combustion**.**
Static Pressure	The standard atmospheric pressure on a standard day at sea level is 14.7 psi.
Static Thrust	The thrust expressed in pounds at ISA sea level conditions, with the aircraft stationary. More thrust definitions are in Chapter 11.

Thermal Efficiency	This is the efficiency of conversion of fuel energy to kinetic energy and, like all heat engines, is controlled by the cycle pressure ratio and combustion temperature.
TIT	Turbine Inlet Temperature measures the gas temperature prior to entering the turbine.
TOT	Turbine Outlet Temperature is the same as EGT.
Translating Sleeve	This sleeve slides rearward on the engine nacelle to expose the cascade vanes during reverse operation.
TSFC	Thrust Specific Fuel Consumption is the amount of fuel in pounds to produce one pound of thrust. This is a measure of jet engine efficiency.
Turbine Stage	A stage is one row of stationary NGVs, followed by one row of rotating blades.
Turbine Shroud	A shrouding fitted to the rotating turbine blade tips to prevent gas flow leakage and excessive vibration.
Water Methanol	The solution of water and methanol used to augment thrust.
Variable Inlet Guide Vanes	Variable incidence stator vanes fitted between early low pressure compressor spools. They are used to prevent the compressor from stalling (controlled by the FADEC.