



Figure 7-47. *Turboprop propeller.*

and propeller electronic control. Modern turboprop engines use dual Full Authority Digital Engine Control (FADEC) to control both engine and propeller. The spinner assembly is a cone-shaped configuration that mounts on the propeller and encloses the dome and barrel to reduce drag.

The synchrophasing system is designed to maintain a preset angular relationship between the designated master propeller and the slave propellers. Propeller operation is controlled by a mechanical linkage from the cockpit-mounted power lever and the emergency engine shutdown handle (if the aircraft is provided with one) to the coordinator, which, in turn, is linked to the propeller control input lever. Newer designs use electronic throttle control that is linked to the FADEC controller.

Turbo-propeller control assemblies have a feathering system that feather the propeller when the engine is shut down in flight. The propeller can also be unfeathered during flight, if the engine needs to be started again. Propeller control systems for large turboprop engines differ from smaller engines because they are dual acting, which means that hydraulic pressure is used to increase and decrease propeller blade angle. [Figure 7-48]

Pratt and Whitney PT6 Hartzell Propeller System

The PT6 Hartzell propeller system incorporates three-, four-, or six-bladed propellers made of aluminum or composite materials. It is a constant-speed, feathering, reversing propeller system using a single-acting governor. Oil from the propeller governor feeds into the propeller shaft and to the servo piston via the oil transfer sleeve mounted on the propeller shaft. [Figure 7-49] As oil pressure increases, the servo piston is pushed forward, and the feather spring is compressed. Servo piston movement is transmitted to the propeller blade collars via a system of levers. When oil pressure is decreased, the return spring and counterweights force the oil out of the servo piston and change the blade pitch to a high pitch position. An increase in oil pressure drives the blades towards low pitch.

Engine oil is supplied to the governor from the engine oil supply. A gear pump, mounted at the base of the governor, increases the flow of oil going to the constant speed unit (CSU) relief valve. When the oil pressure reaches the desired level, the relief valve opens to maintain the governor oil pressure. When the speed selected by the pilot is reached,