Flight Tests, Performances and Flight Certification of a Twin-Engine Light Aircraft

Fabrizio Nicolosi[1] and Agostino De Marco.[2]
University of Naples "Federico II", Naples, Italy

Pierluigi Della Vecchia[3]
University of Naples "Federico II", Naples, Italy

This paper deals with flight test activities performed on P2006T, a twin-engine light aircraft recently designed and produced by Tecnam. Research activities and flight tests have been conducted during the flight certification of P2006T for the normal category under CS-23. All the acquired data and flight results presented have been focused on both aircraft certification and on aircraft performances, stability and flight qualities measurement. The data have been acquired through a light, accurate and reliable flight instrumentation available at DIAS (Department of Aerospace Engineering). Some flight data about aircraft leveled speed, stall speed, climb characteristics and ground performances (take-off and landing) will be presented. After preliminary flight tests, winglets have been designed and added to the final configuration in order to obtain good climb performances also in OEI (One Engine Inoperative) conditions. Accurate stall tests have been performed in all configurations and influence of both entry-rate and load factor on stall speed have been highlighted. Excellent ground performances have been measured with short take-off and landing distances compared with similar airplanes. All measured flight performances can be considered very good for this aircraft category and have been used to demonstrate aircraft safety and to obtain CS23 certification.

Nomenclature

AR	=	Wing Aspect ratio
a_Z	=	Vertical acceleration (g)
c	=	chord (also MAC , Mean Aerodynamic chord)
C_{LMAX}	=	Maximum lift coefficient $= (nW/qS)$
C_{Ls}	=	Stall lift coefficient $= (W/qS)$
Hp	=	Pressure Altitude (ft)
n	=	load factor $(=a_Z/g)$
q	=	Flight dynamic pressure $= \frac{1}{2} \rho V^2$
S	=	Wing Area
T	=	Temperature
V	=	Flight speed
V_2	=	Flight speed over obstacle (take-off)
V_{CAS}	=	Calibrated Air Speed (usually in kts)
V_{IAS}	=	Indicated Air Speed (usually in kts)
V_{LOFF}	=	Lift-Off Speed (take-off)
V_{NE}	=	Never exceed speed
V_R	=	Rotation speed (during take-off)

---

[1] Assistant Professor, Univ. of Naples "Federico II", Dep. of Aerospace Engineering (DIAS), Via Claudio 21, 80125 Napoli, Italy; fabrnico@unina.it. AIAA Senior Member.
[2] Assistant Professor, Univ. of Naples "Federico II", Dep. of Aerospace Engineering (DIAS), Via Claudio 21, 80125 Napoli, Italy, agodemar@unina.it. AIAA Senior Member.
[3] PHD student, Dep. of Aerospace Engineering (DIAS), Via Claudio 21, 80125 Napoli, Italy.