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Surrogate Modeling for the Main Landing Gear Doors of an Airbus Passenger Aircraft

D. Viúdez-Moreiras^{*1}, M. Martín¹, R. Abarca², E. Andrés³, J. Ponsín¹
and F. Monge¹

¹ Spanish National Institute for Aerospace Technology (INTA),
Ctra. Ajalvir, km. 4. 28850 Torrejón de Ardoz (Spain)

² Airbus Operations SL, Getafe, Spain.
Paseo John Lennon, s/n, 28906 Getafe, Madrid (Spain)

³ Ingeniería de Sistemas para la Defensa de España S.A. (ISDEFE-INTA) &
Technical University of Madrid (UPM)
Ctra. Ajalvir, km. 4, 28850 Torrejón de Ardoz (Madrid), Spain.

ABSTRACT

Main Landing Gear Doors of commercial aircraft are affected by significant dynamic loads during flight, mainly due to the aerodynamic excitation. Thus, an accurate prediction early in the design results an important matter to select the optimal aerodynamic configuration. Therefore, a significant budget is invested by manufacturers in order to test the aerodynamic performance by means of wind tunnel and flight testing. However, the high cost associated to these tests restricts the number of test cases that can be performed. This paper presents a new surrogate model for the unsteady aerodynamics characterized by wind tunnel testing, in order to predict the aerodynamic effect in previously untested conditions, and in this way, to allow a first stage exploration of new areas in the design space, without the need of expensive wind tunnel or flight testing. Experimental results within the Main Landing Gear Doors of an Airbus Long Range Passenger Aircraft are presented, showing the benefits of this methodology.

Keywords: Wind tunnel; Flight Testing; Aerodynamic prediction; Surrogate modeling.

* Contact Author, Fluid Dynamics Branch, Department of Aircraft, dviudezmoreiras@gmail.com

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