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## Comparison of black-grey-white box approach in system identification of a flight vehicle (Conference Paper) [\(Open Access\)](#)

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### Abstract

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Developing an autonomous flight control system for a fixed-wing unmanned aerial vehicle (UAV) requires the mathematical representation of the system dynamics which can be obtained through system identification, such as using white, grey or black box methods. In this paper, three system identification methods; white method modeling using Cook formulas which is used analytically to develop the linear-time-invariant model structure with the aerodynamic coefficients of the UAV extracted from Missile DATCOM computations at certain flight conditions, and two empirical mathematical models constructed from non-linear flight simulator defined as the Greyification of Black Box Model (B2G) and Direct Grey to White Linkage (G2W). The comparison shows that both empirical methods prove to be very instrumental to contrast and produce higher sense of engineering than the analytical one. © Published under licence by IOP Publishing Ltd.

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