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The use of orthogonal arrays in optimum conditions for drogue re-fueling of unmanned aerial vehicles

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Unmanned Aerial Vehicles (UAV) are being deployed more in both civil and military applications for a wide variety of applications. These UAVs are not limited by the hours the pilot has flown as they are flown remotely and changes of pilots are endless. In theory they could fly until maintenance needed if they can be refueled. This research follows on from previous research that addressed the designs and practical implications of refueling where a drogue system is the only practical solution. The problems of low speed refueling compound the float both laterally and transversely from a trailing drogue. This paper presents the results from a design of experiments of a full orthogonal array using three inputs, speed and length of drogue from UAV and weight of drogue at two levels. Variations within samples and between samples show that an interaction exists. The statistical analysis identifies that designs are critical to the length of the drogue extension is more than the speed and weight. Recommendations are made that will assist in the improvement of the design process.

Biography

Ian R McAndrew holds a PhD in Mechanical Engineering, two Master's and two Bachelors' degree. He spent 12 years in industry as a designer before entering academia. He has over 20 years of teaching experience in the UK, Europe, Middle East and Far East. He has supervised many PhD students and published extensively for over 20 years. Currently he is the Department Chair of Graduate Studies in the College of Aeronautics Worldwide at Embry Riddle Aeronautical University. His research interests are in Aerodynamics and Effective Education, which he has published extensively

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