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Reverse Engineering of Aircraft Master Models Using Real-Time Photogrammetry with Projected Targeting

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REVERSE ENGINEERING OF AIRCRAFT MASTER MODELS USING REAL-TIME PHOTOGRAMMETRY WITH PROJECTED TARGETING

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ABSTRACT

In the aircraft and aerospace industries, the requirement to digitize existing large master models is motivated by the high cost of storage and maintenance, and the clear advantages associated with the use of computer versus physical models. While the need is great, the measurement of such objects is a challenging task, and one for which fast and efficient metrology techniques have not been readily forthcoming. Real-time photogrammetry, combined with stroboscopic target projection provides an attractive and effective solution. This paper describes the use of such an approach in the surface measurement of a fairing gauge for The Boeing Company. The system utilized here can project more than 20,000 targets and determine their triangulated three-dimensional coordinates in a single epoch. Multiple epochs are automatically combined in a common coordinate system yielding a final data set with potentially hundreds of thousands of points. Following a detailed description of the system itself, practical aspects of the photogrammetric measurement are discussed, including an analysis of the accuracy of the technique.