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Stereo PIV Measurements of a Juncture Flow on a Wing-Fuselage Model DAVID JEON, DAMIAN HIRSCH, MORTEZA GHARIB, Caltech — Anywhere two surfaces intersect on the outer surface of an aerodynamic body, a corner flow can result in that juncture region. These juncture regions can result in unexpected separation or vortical flows that can have an outsized effect on the global flow field. In addition, CFD models tend to struggle with this type of separation, where the boundary layers on each surface have different characteristics. To help with model validation, a series of stereo PIV measurements were taken in the separation region of a wing-fuselage model. The model consists of a floor mounted fuselage section with a cambered wing extending from the middle. Tests were conducted at a chord Reynolds number of 500,000 in air, with the wing boundary layer tripped near the leading edge. Oil film visualization confirmed a large separation bubble at the trailing edge juncture, and it was in this location that the measurement planes were located. These measurements capture the 3D nature of the separation and show effects of small changes in model configuration on the separated flow. This work was supported by The Boeing Company through grant number CT-BA-GTA-1.

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