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Combined PSP and PEC Testing JACK KAWELL, Samford University — This research presents a technique that combines a pressure sensitive paint (PSP) with a photoelastic coating (PEC) to measure both pressure and strain simultaneously. Though this can be accomplished with high accuracy using measuring devices such as strain gauges and surface pressure ports, these point-wise methods do not have high spatial resolution, which is often required in aerodynamic testing. The use of PSP and PEC for measuring pressure and strain is well documented, but thus far, these techniques have been used separately. In this research, we layered a PSP over a PEC and conducted tests to verify the viability of this method for measuring pressure and strain simultaneously. We constructed a benchtop pressure chamber with a cantilever beam to control both the pressure and strain on a specimen. Then we verified and calibrated the new technique by altering the pressure and strain. Results will focus on the sensitivity of the technique and the decoupling of pressure and strain. In the future, this technique could be highly useful for aerospace applications or any other field where high-definition, unsteady pressure and strain fields across a surface are desired.

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