

Abstract Submitted
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Control of Acoustic Reflections in a Closed-Circuit Wind Tunnel¹

MATTHEW KUESTER, EDWARD WHITE, Texas A&M University — Closed return wind tunnels, such as the Klebanoff–Saric Wind Tunnel (KSWT) at Texas A&M University, can provide low-disturbance flows that are required to study boundary layer receptivity. Receptivity is the process through which environmental disturbances become the initial condition for boundary layer instabilities. One instability mechanism, Tollmien–Schlichting waves, is especially receptive to freestream sound. The receptivity of these waves is studied by introducing downstream-traveling planar sound waves that interact with the leading edge of a flat plate; however, changes in wind tunnel area create reflected waves that complicate the experiment. Reflections are mitigated using a secondary speaker located downstream of the test section that eliminates upstream-traveling reflections. The secondary speaker is controlled using a finite impulse response (FIR) filter. Microphone measurements are used to document the wave cancellation at multiple locations in the test section.

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Matthew Kuester
Texas A&M University

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