Abstract Submitted
for the DFD07 Meeting of
The American Physical Society

High Reynolds number rough wall turbulent boundary layer experiments using Braille surfaces MICHAEL HARRIS, New Mexico State University, JASON MONTY, University of Melbourne, TODD NOVA, University of Minnesota, JAMES ALLEN, New Mexico State University, MIN CHONG, University of Melbourne — This paper details smooth, transitional and fully rough turbulent boundary layer experiments in the New Mexico State high Reynolds number rough wall wind tunnel. The initial surface tested was generated with a Braille printer and consisted of an uniform array of Braille points. The average point height being 0.5mm, the spacing between the points in the span was 0.5mm and the surface consisted of span wise rows separated by 4mm. The wavelength to peak ratio was 8:1. The boundary layer thickness at the measurement location was 190mm giving a large separation of roughness height to layer thickness. The maximum friction velocity was $u_\tau = 1.5m/s$ at $Re_x = 3.8 \times 10^7$. Results for the skin friction coefficient show that this surface follows a Nikuradse type inflectional curve and that Townsends outer layer similarity hypothesis is valid for rough wall flows with a large separation of scales. Mean flow and turbulence statistics will be presented.

James Allen
New Mexico State University

Date submitted: 06 Aug 2007 Electronic form version 1.4