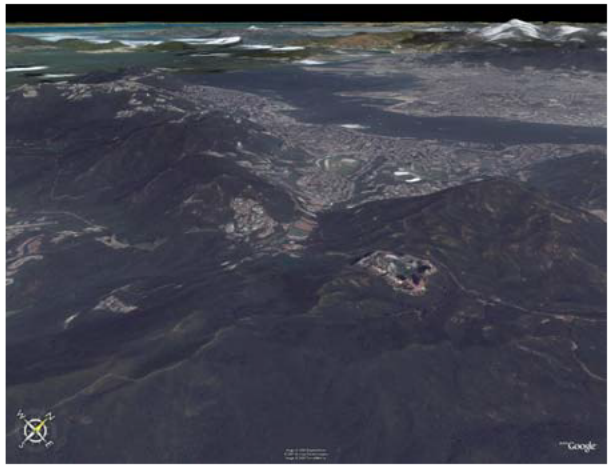
Alan G. Davenport Wind Engineering Group, The Boundary Layer Wind Tunnel Laboratory

Wind Environment Studies for Complex Topographic Terrain

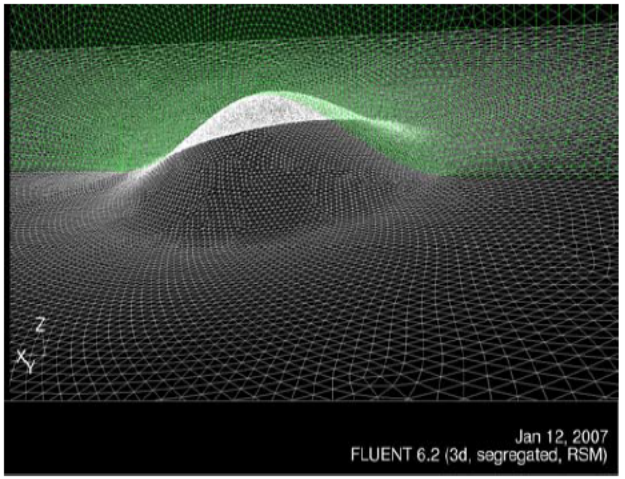


Google earth view of the investigated topography

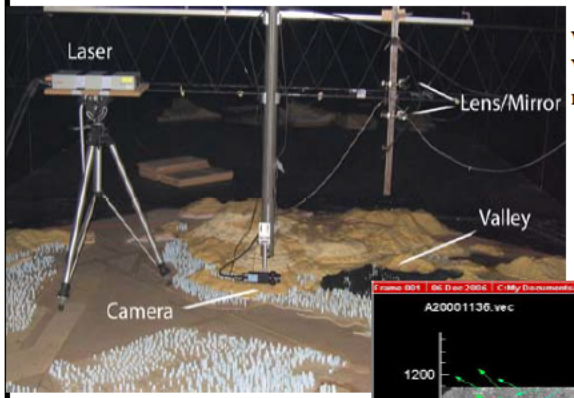
Summary

•Wind Environment Studies are critical in areas of Complex Topographic Terrain unfitted for mesoscale model predictions.

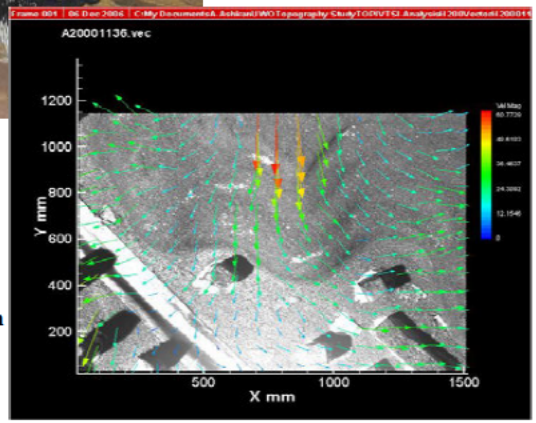
•Experimental (Particle Image Velocimetry –PIV), Numerical (Computational Fluid Dynamics – CFD) and Analytical modeling are conducted to determine wind velocity and wind energy mapping over topography.



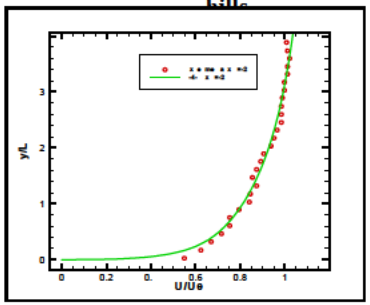
Three-dimensional grid for CFD analysis of flow over hill

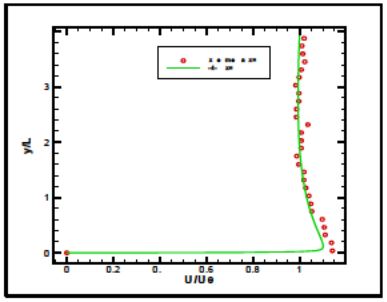


Wind Tunnel Particle Image Velocimetry (PIV) measurements

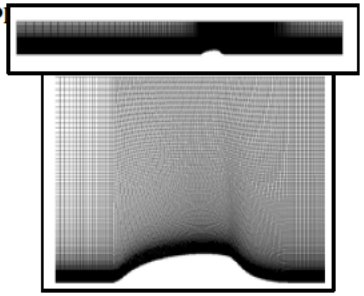


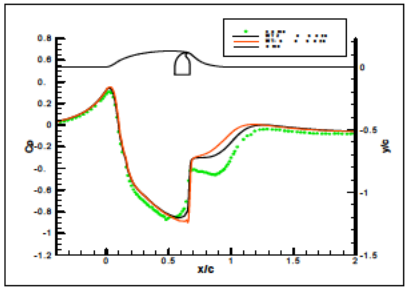
PIV measured velocity vectors in a horizontal plane - elevation: 200m, resolution 6m





Numerical vs. Experimental velocity profiles. Left: Upstream hill location; Right: Hill to





NASA hump. Left: Computational grid, Right: Pressure Coefficients, CFD vs. experiments

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