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DNS of turbulent flow past a bluff body with a compliant tensegrity surface ANISH KARANDIKAR, THOMAS BEWLEY, Flow Control Lab, Dept of MAE, UCSD, La Jolla CA 92037 — Direct numerical simulation (DNS) is used to study turbulent incompressible flow past a bluff body with a compliant surface. We use a 3D time-dependent coordinate transformation to account for the motion of the bluff body surface. Spatially, the flow domain is discretized using a dealiased pseudospectral method in the axial and azimuthal directions, while the radial (wall-normal) direction is discretized using a finite difference scheme. The grid is stretched in the azimuthal direction, which is handled spectrally. This leads to a unique challenge when solving the Poisson equation in the fractional step method for the time march, which we address with both multigrid and preconditioned BiCGStab algorithms. We are presently extending this flow code with a model for the compliant bluff body surface based on the "tensegrity fabric" paradigm which combines compressive members (bars) and tensile members (tendons) in a stable, flexible network.

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