The recent resolution of the main conjecture for Vinogradov’s mean value theorem depends crucially on the system of Diophantine equations associated with the mean value being translation-dilation invariant. The absence of translation-dilation invariance is usually seen as an impediment to establishing the sharpest bounds that one might envision. In this talk we illustrate ideas by reporting on an example where the absence of translation-dilation invariance plays a critical role. Specifically, we establish a Hasse principle for the existence of lines having integral coordinates passing through a fixed integral point lying on an affine diagonal hypersurface of degree $d$ whenever it possesses $d(d + 1)$ or more variables. This conclusion, derived via the circle method, surmounts the conventional convexity (“square-root”) barrier for this problem. (Received August 04, 2020)