

Abstract Submitted  
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**Estimation of the Concentration from a Gaseous Moving Source Using Collaborating Sensing Aerial Vehicles<sup>1</sup>** TATIANA EGOROVA, MICHAEL A. DEMETRIOU, NIKOLAOS A. GATSONIS, Worcester Polytechnic Institute — This work considers the estimation of the concentration field caused by a moving gaseous source. A model-based estimation scheme incorporates the vehicle dynamics in the estimation scheme in order to arrive at a guidance control law that is dictated by the performance of the estimator. The model-based estimation scheme provides on-line estimates of the concentration field and of the proximity of the moving source. The process state estimate is realized through the use of multiple sensing aerial vehicles (SAVs) that have collaborating capabilities. Each SAV implements its own model-based estimator using its own sensor measurements and shares its estimate with the remaining SAVs. The advantage of the collaborating scheme is the faster convergence of the process state estimate. Computational results demonstrate the advantage of the SAV collaboration in estimating the process state and the proximity of the moving source.

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