

Title: Velocity measurement simulative study of twin plane ECT using advanced cross correlation technique

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Abstract: Flow velocity is a critical information to have in order to ensure an optimum flow condition in a process plant. The combination of Electrical Capacitance Tomography and cross correlation technique has been successfully used to measure the velocity of multiphase flows. The peak of the cross correlated signals corresponds to the time taken by particles to move along the flow, thus its velocity can be derived. This paper investigates the capability of implementing an improved method of determining flow velocity by using a combined function of the cross correlation (CCF) and average squared differential (ASDF) functions in order to improve the accuracy of the velocity measurement. A velocity measurement simulation of a liquid/gas flow using MATLAB is employed and a comparison between the use of CCF and the combination of CCF/ASDF is made. The correlogram of the combined CCF/ASDF method has a sharper peak compared to the correlogram of the conventional CCF method, indicating that the peak of the function can be determined more accurately as the sharper peak can decrease the measurement uncertainty.