1006-65-253   **Brian S Nutter** (`brian.nutter@ttu.edu`), Department of Electrical Engineering, Texas Tech University, Box 43102, Lubbock, TX 79409, **Lakshminarasimhan V Sampath** (`veeyesln@yahoo.com`), 174 North Mount Tabor Road, Apt 159, Lexington, KY 40509, **James Arn Womble*** (`jawomble@aol.com`), Department of Civil Engineering, Texas Tech University, Lubbock, TX 79409, and **Kishor C Mehta** (`kishor.mehta@ttu.edu`), Department of Civil Engineering, Texas Tech University, Lubbock, TX 79409. *Analysis and Statistical Characterisation of Windstorm Damage using Aerial Images.*

Near-real-time information about damage extent caused to features in a locality by natural disasters is very important for short and long-term emergency response and resource allocation. Time-consuming ground-truthing methods become infeasible due to accessibility and man-power problems. Image processing offers a quicker, less expensive, and easier alternative to this problem. This project defines damage extent using statistical descriptors obtained from aerial photographs taken before and after the disaster. These images suffer from severe misalignment due to differences in perspective, and presence of debris and rubble, which cause difficulties in obtaining a pixel-to-pixel accuracy in registration. A two-stage registration is performed to obtain best practical accuracy. The first uses a Geometric Transformation method based on Ground Control Points, and the second develops a metric based on surviving features from different sections of the image, and uses this metric to align the images. The pre-disaster image is then segmented, and its features are individually identified and uniquely labeled. Damage extent to each of these features is then evaluated using several statistical descriptors. Immediate and reliable information about damage extent is thus obtained. (Received February 15, 2005)