Abstract: This Small Business Innovation Research Phase I project investigates methods for increasing ASR robustness in noisy environments by combining the best features of two complementary speech inputs. Current speech recognition systems do not yield acceptable results when processing corrupt speech input. The first objective of this research is to identify methods for finding unreliable segments within the primary input utterance. The noise found in the primary input will not be identical to the noise in the secondary input, but the speech signals in both will have generally the same properties. For this reason, individual corrupted segments in one speech input should not be corrupt in the other. The second objective is to develop a method that matches unreliable segments in one utterance with clean segments in the other. The third objective is to determine how to replace the unreliable segments with the corresponding clean segments. The results of this research will be applicable to the development of a prototype dual-speech processing system in Phase II.