

System of Systems: A Decision Informatics Approach to Urban Security

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Abstract. Urban infrastructures are the focus of terrorist acts because, quite simply, they produce the most visible impact, if not casualties. While terrorist acts are the most insidious and onerous of all disruptions or security breaches, it is obvious that there are many similarities to the way one should deal with these willful acts and those caused by natural and accidental incidents that have also resulted in adverse and severe consequences. However, there is one major and critical difference between terrorist acts and the other types of disruptions: the terrorist acts are willful – and therefore also adaptive, if not coordinated. One must counter these acts with the same, if not more sophisticated, willful, adaptive and informed approach. Real-time, information-based decision making – which Tien [2003] has called the decision informatics paradigm – is a computational systems approach advanced herein to help make the right decisions at the various stages of a disruption. It is focused on decisions and based on multiple data sources, data fusion and analysis methods, timely information, stochastic decision models and a systems engineering outlook; moreover, it is multidisciplinary, evolutionary and systemic in practice. The approach provides a consistent way to address real-time security issues, including those concerned with the preparation for a major disruption, the prediction of such a disruption, the prevention or mitigation of the disruption, the detection of the disruption, the response to the disruption, and the recovery steps that are necessary to adequately, if not fully, recuperate from the disruption. The efforts of the academically-based U. S. Homeland Security Centers of Excellence are considered within the proposed types, stages and decisions framework.

Bio. Dr. James M. Tien received the BEE from Rensselaer Polytechnic Institute and the SM, EE and PhD from the Massachusetts Institute of Technology. He has held leadership positions at Bell Telephone Laboratories, at the Rand Corporation, and at Structured Decisions Corporation (which he co-founded in 1974). He joined the Department of Electrical, Computer and Systems Engineering at Rensselaer in 1977, became Acting Chair of the department, joined a unique interdisciplinary Department of Decision Sciences and Engineering Systems as its founding Chair, and twice served as the Acting Dean of Engineering. Dr. Tien's areas of research interest include the development and application of computer and systems analysis techniques to information and decision systems. He has published extensively, been invited to present many plenary lectures, and been honored with both teaching and research awards, including being elected a Fellow in IEEE, INFORMS and AAAS and being a recipient of the IEEE Joseph G. Wohl Outstanding Career Award, the IEEE Major Educational Innovation Award, the IEEE Norbert Wiener Award, and the IBM Faculty Award. Dr. Tien is also an elected member of the U. S. National Academy of Engineering. <http://www.jimtien.com>, tienj@rpi.edu.

