

SBIR 06.2 PHASE I - AWARD DETAILS	
ORGANIZATION	CERDEC
TOPIC NUMBER	A06-126
CONTRACT NUMBER	
YEAR OF AWARD	
AWARD START DATE	
AWARD COMPLETION DATE	
PROPOSAL NUMBER	A062-126-1580
TITLE	An Integrated Operational Design Methodology and Toolset for Mobile Ad Hoc Networks
PROJECT MANAGER	Senni Perumal (301) 468-5541 senni.perumal@aims-sys.com
COMPANY	AIMS Inc. 6213 Executive Boulevard Rockville MD 20855 Minority Owned: No Veteran Owned: No Number of Employees: 6
KEYWORDS	MANET design, MANET models, capacity region, multi-criteria tradeoff, UAV placement
ABSTRACT	An innovative methodology for the integrated, systematic and model-based design of mobile ad hoc networks (MANET) is proposed based on a practical operational view of a MANET. It combines practical abstractions and models of the key components of a MANET, multi-criteria optimization for tradeoff analysis, and recent results on the capacity region of a MANET and distributed differential backpressure algorithms for sustaining stable operation of a MANET. Time varying traffic demands, network conditions and topologies are accommodated within the proposed methodology. Dynamic placement algorithms of nodes to improve performance and connectivity, including UAVs, are also proposed. The methodology leads to the development of novel and powerful software environments and toolsets for the design of MANET to meet specifications and provides predictable performance bounds. During Phase I the feasibility of the approach will be demonstrated and an initial implementation of design tools in a MATLAB environment will be completed.
BENEFITS	Anticipated Benefits: Models for MANET components suitable for model-based design, new systematic methodologies for the design of military MANET, of commercial MANET, design toolsets for the design and deployment of MANET, at least ten fold reduction in design time and design cost (from request to deployment), validation and verification toolsets for MANET performance according to specifications, dynamic on-line algorithms for control and operation of dynamic MANET to meet changing mission requirements and environmental conditions. Potential Commercial Applications: low cost high performance autonomic wireless networks for: disaster relief networks, establishment of 'instant' communication infrastructures, homeland security.

	sensor networks for the environment or for security, collaborative robotics, wireless broadband infrastructures world-wide, wireless mobile communication networks for health care monitoring-delivery-management.
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