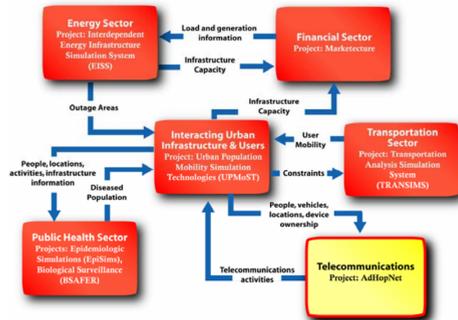




National Infrastructure Simulation & Analysis Center

Telecom Sector

End-to-End Analysis of Next Generation Telecommunication Networks (AdHopNet)
 Point of Contact: Madhav Marathe - marathe@lanl.gov



Purpose

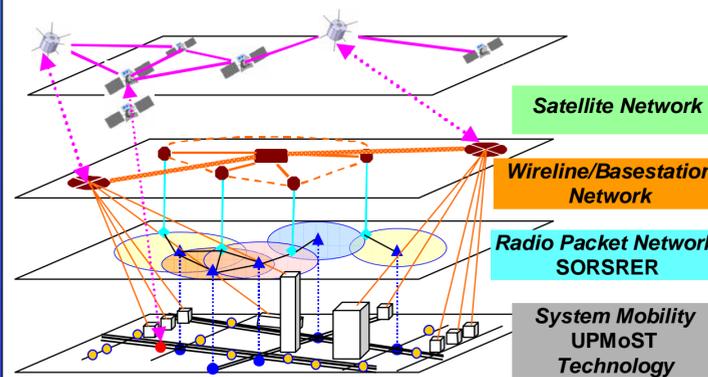
- Develop an interdependency aware suite of analytical tools for vulnerability assessment of the Telecom Infrastructure
- Designed to integrate with existing communication network simulations

Target: Third Generation & Beyond (3G+) InfoCom Network

- End-to-end packet level simulation of mobile communication systems
- 10^7 - 10^9 mobile clients in an urban region, 10^{12} - 10^{14} packets per hour
- Each individual demographically defined; each activity defined; each capable of creating or receiving realistic packet sessions
- Technology adaptable with access to (proprietary) information for base station operations, coverage and wire-line information

Novelty

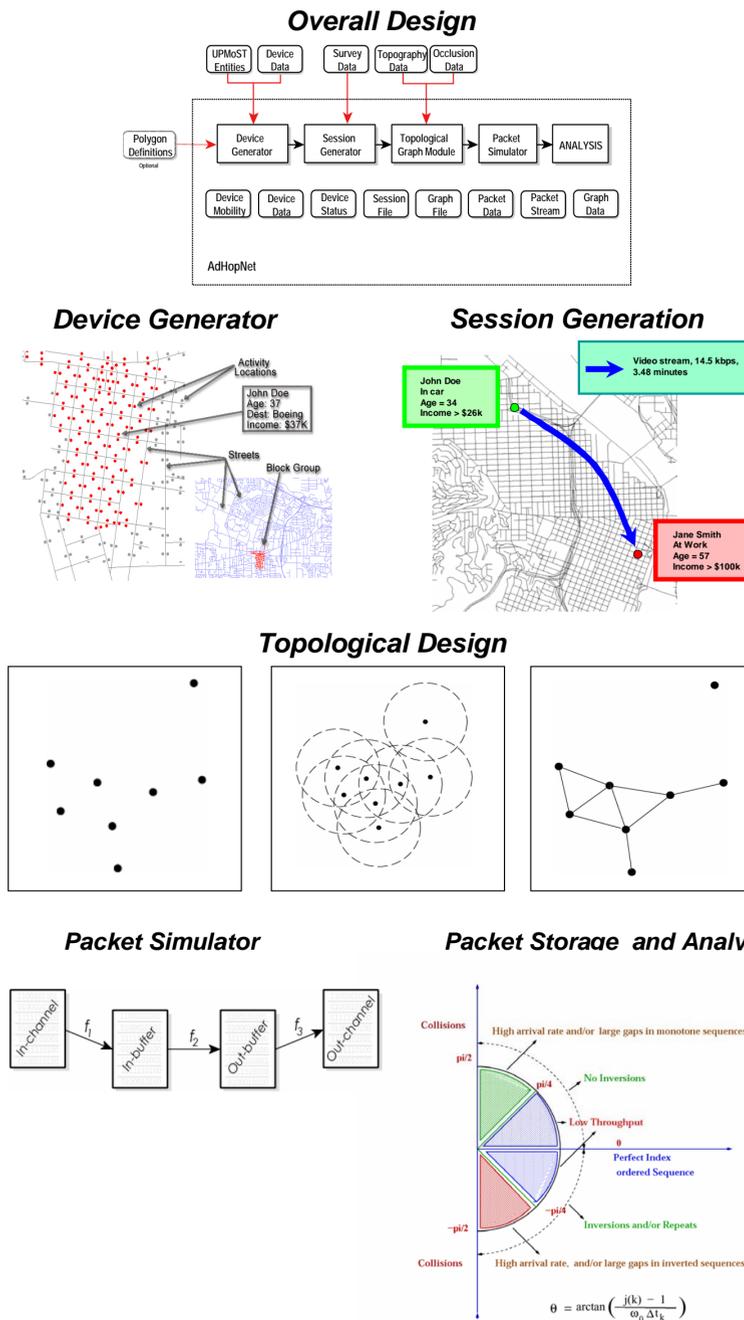
- **Mathematical and computational theory (Sequential Dynamical Systems) based specification, analysis and software development**
- **Realistic individual-based mobility models, device assignment and work-load generation methods**
- **Parametric, Approximate, Efficient and Generic protocol representation**
- **Methods for large scale network measurement and analysis**
 - Signal theoretic methods for efficient storage and dynamic regeneration of packet sequence dynamics
 - Graph theoretic analysis of dynamic networks
 - Statistical methods for evaluation and cross-layer interaction of network protocols



Applications

- Emergency management planning, response and restoration of communication systems in a built urban infrastructure.
- Detection and mitigation of attack on network control operations of urban infrastructure (e.g. transport, electrical grid)
- Detection and mitigation of distributed denial of service attacks especially in wireless networks
- Effects of regulations and policies on operations and reliability of communication networks e.g. Radio frequency allocation and prioritization schemes

Approach



Results

