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Far Out Networking
- Protocols WG Readout

Thyaga Nandagopal

Thanks to all of those who contributed to
the vigorous discussion and provided inputs

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What is the role of protocols?

- Provide an interface for information delivery using the underlying system

- Discussion driven by a perception that the lack of progress in MANET scaling has been due to
  - Failure to understand information contexts
  - Sticking with traditional protocol design methods

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Discussion topics?

- What are the apps that really need MANETs?
- What are the pressing problems?
- What approaches can lead to breakthroughs
- Evaluation methods

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Cool Apps

- UAV Control and Coordination
  - 100s of UAVs
- Common Operating Picture100s of UAVs
  - At any granularity and scale
- Real-time multimedia to the battlefield
- Military logistics and supply chains100s of UAVs
  - Tens of millions of active tags lasting for years

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Important Problems

- Ad hoc addition/removal of mobile devices and networks
- Information-centric architecture
  - Leveraging data fusion and high levels of computational power available at intermediate devices
- Supporting a diversity of networking methods
- Need to find a common layer (or do we?)
- Providing flexible bindings between names, data, addressing, and devices
  - Geographic addressing, content-based addressing, relational addressing
- Many-to-many communications primitives

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Approach to Breakthrough

- Contextual Computing and Communication
- Data Ontologies for information-centric ...
- Devices with context-sensitive addresses
- Standardization above PHY (or around it)
- Better PHY for high data rates at short distance
- Awareness of performance constraints through symptotic analysis
- Mobility control for higher capacity
- Cooperative communication (virtual MIMO) coupled with data fusion
- Cut-through relaying leveraging full-duplex
- Sleep synchronization, energy-aware contextual protocol design, redundancy once scalability is proven to increase network lifetimes

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How to Validate

- Symptotic modeling
- Low-cost robotic emulation
- Miniaturized city-scale testbeds
- Large-scale experimentation
- Crowd-sourcing experiments on military bases
- Cross-validation of simulator performance at scale, for beyond-scale testing

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Why all of this?

- MANETs are essential, now and in the future

- Enable Common Operating Picture
- Reduce mission planning times
- Enable logistics at finer scales
- Make operations more efficient

- Unify defense communication systems
- Increase force multiplier effect

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