ResiliNets Strategy for Resilient and Survivable Networking

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**D²R²+DR Resilience Strategy**

- **D²R²**: real-time loop during network operations
  - defend against threats & challenges to normal operation
    - passive (e.g. redundancy)
    - active (e.g. packet filtering)
  - detect adverse event
    - that has penetrated defenses
  - remediate effects to min. impact
  - recover to original normal ops.
- **DR**: background actions
  - diagnose faults that allowed penetration of defenses
  - refine future D²R² behaviour to do better

**Resilience Axioms and Principles**

- Resilience axioms: **IUER**
  - Inevitability of faults (perfect systems infeasible)
  - Understand normal operations
  - Expect adverse events and conditions
  - Respond to adverse events and conditions
- Principles for resilient network design
  - service requirements
  - state management
  - resource tradeoffs
  - self-protection connectivity
  - redundancy
  - diversity
  - context awareness
  - scalability
  - self-organising and adaptable
  - evolvable

**Multilevel Resilience Model**

- ResiliNets Cube: multilevel
  - layers
    - each layer provides foundation for next layer up
  - planes
    - data, control, management
  - engineering
    - fault tolerant components
    - surv. topology
    - DT E2E transport
    - adaptive applications

**Resilient Network Interaction**

- Funding for this research provided in part by the National Science Foundation FIND and EU FP7 FIRE Programme [ComNet 2010] 10 June 2010