Generic Programmable Tag (GPT)
Original Motivation

• Biologists/Ecologists desire data acquisition systems with:
  – Automated localization
  – Automated Data Telemetry
  – Low cost tags
  – Longer range
  – Programmable
  – Multi-year capability
  – Low tag mass
  • Flying vertebrates can carry no more than ~ 4% of their body mass
Existing Wildlife Tracking Tags

• 50+ years old design with:
  – Fixed frequency by crystal
    • Each custom-made tag
  – No flexibility in transmission scheduling
    • Limited lifetime set by RC time
    • No calendar functionality
  – Trivial signal modulation
    • Data sent via on-off-keying
    • low data rate
    • Unsuitable for Real-time Locating Systems (RTLS)
Cornell GPT Technology

• Low mass
• Fully programmable
  – Transmission scheduling with calendar
  – Wide range of operating frequency
  – Various modulation formats
• “Lifetime tag”
  – Solar cells and low energy requirements
• Longer range of coverage
• Cost effective
  – Common hardware with customization via software
• “Inverse-GPS” system for automatic localization in real time with no human intervention required after installation
How It Looks

Universal platform for persistent embedded wireless sensors
Potential Applications

• Wildlife/people/objects tracking
• Radio-frequency Identification (RFID)
  – Active (E-Zpass, LoJack)
  – Passive (Point-of-sale, inventory/supply chain management)
• Bluetooth Low Energy (BLE)
  – Healthcare sensors (temp, blood pressure, glucose, etc)
  – Sports & Fitness (heart-rate, cadence, etc)
  – Proximity Sensing (electronic leash)
  – Personal Inventory (find lost-items)
• Real-Time Locating System (RTLS)
  – Time-of-flight
  – Passive RFID
  – Direction-of-arrival
For More Information

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• Cornell Reference Number: 6386
  http://cornell.flintbox.com/public/project/25574/