NASA-JSC Update on RIFD-enabled Sensing Work

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Recent Accomplishments

• built prototype RFID-enabled sensor node:
  – built on JSC-developed modular instrumentation platform
  – uses Cypress WM72016 C-G2 FRAM development board
  – implements DTN-like overlay to manage custody transfer of data to roaming interrogator

• built prototype mobile RFID interrogator:
  – iRobot Create base provides (autonomous?) mobility
  – ThingMagic Mercury 6e reader interrogates EPC Global C1-G2 RFID tags
  – RaspberryPi integrates components
Recent Accomplishments (cont.)

• tested interrogator/node combination
  – synthetic (counter) data generated at 0.5 Hz
  – interrogator piloted to make intermittent passes near node
  – all data (>1 hr.’s worth) successfully transferred

• tested sensor interface
  – thermocouple interfaced to stack with 0.5 Hz sample rate
  – thermal events generated between interrogator passes and recovered/displayed upon interrogation

• results to appear in WiSEE 2014 paper (?)
Ongoing/Forward Work

• investigating a number of commercial RFID (EPC Global C1-G2) sensor technologies:
  – integrated sysetms (e.g., AMS SL900A, Phase IV SensTAG, etc.)
  – RFID-enabled memories (e.g., Cypress WM72016-6, Fujitsu MB97R804B, Impinj MonzaX)

• focusing mainly on battery-assisted sensing
  – batteries provide power for MCU/sensors; RFID interrogator provides power for comm
  – months- to years-long operation targeted (depends on sample rate)
  – beginning to explore power-harvesting options (e.g., Powercast RF)

• targeting developmental flight instrumentation (DFI) applications
  – ~500 μA active current (without sensors)
  – single-sensor sampling rates from 100 Hz – 1 kHz