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NASA-JSC Update on RIFD-enabled Sensing Work

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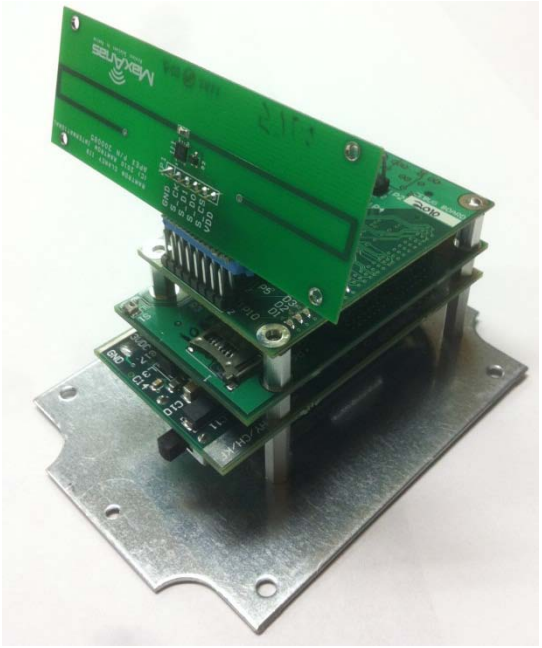
Recent Accomplishments

- **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

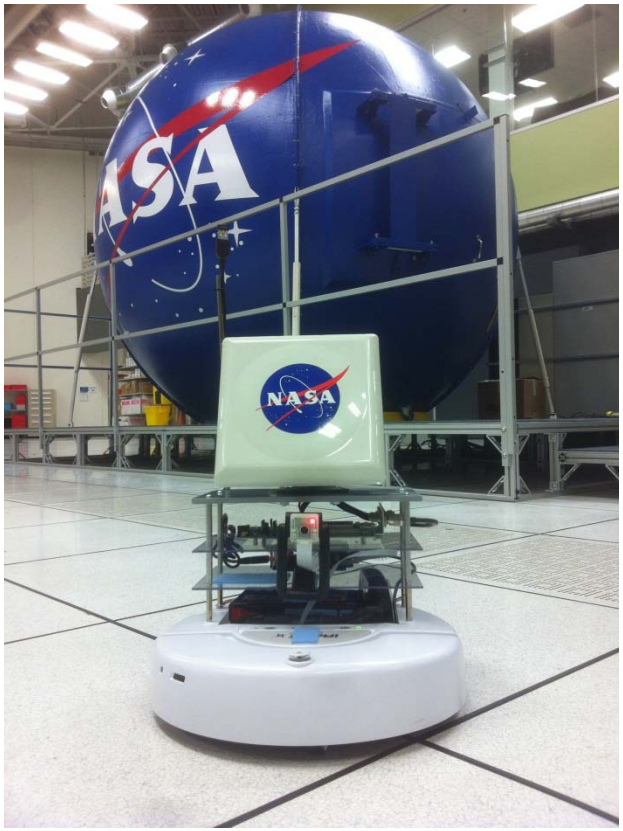
- **built prototype mobile RFID interrogator:**
  - iRobot Create base provides (autonomous?) mobility
  - ThingMagic Mercury 6e reader interrogates EPC Global C1-G2 RFID tags
  - RaspberryPi integrates components



Cypress board on modular instrumentation stack

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 (?)**



mobile RFID interrogator

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