

Self-reliant, miniature DASH7 tag for ubiquitous applications

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October 18, 2012

Highlights

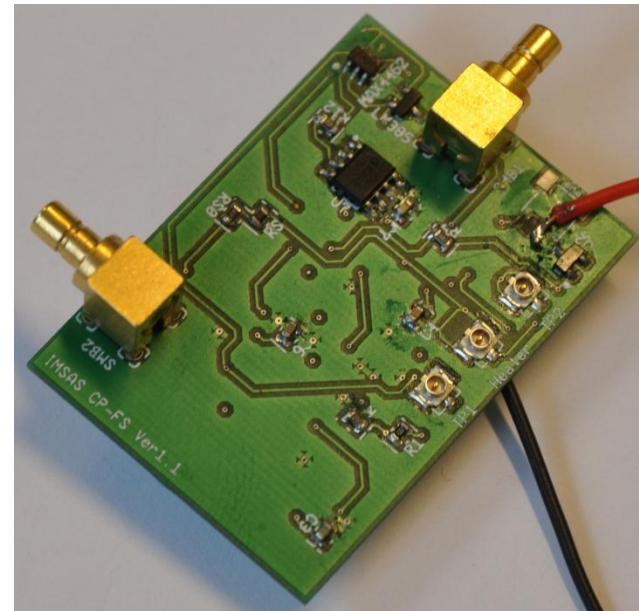
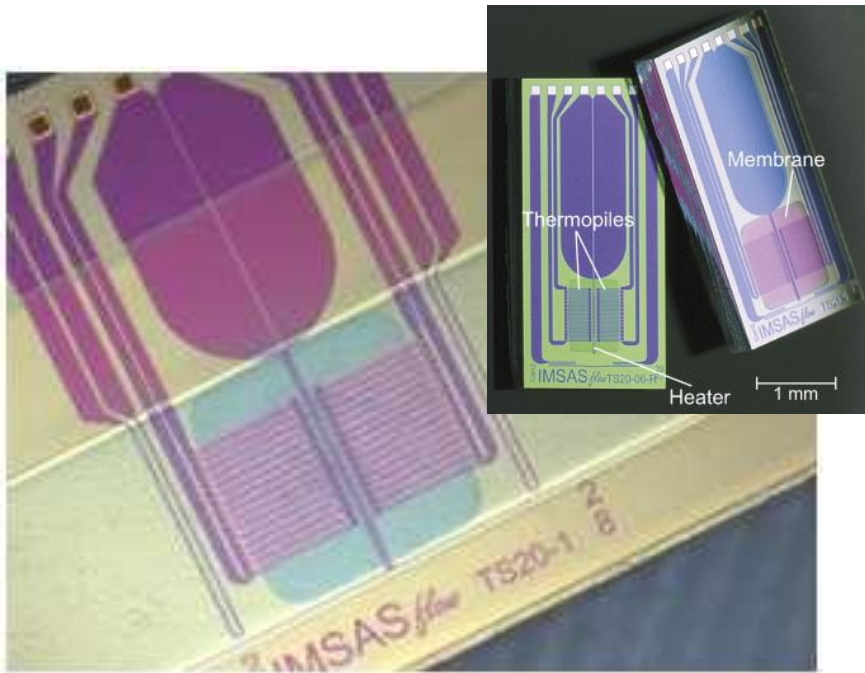
- My work at IMSAS
- Air flow sensors
- DASH7 collaborative traineeship
- DASH7 IMSAS tag
- Future work

My work at IMSAS

- Work associated with Intelligent Container
- Air flow sensing in refrigerated containers
 - Avoidance of hot spots
- Studies on correlation of airflow and temperature/humidity (pending results)
- Wireless embedded system design
 - DASH7 IMSAS Tag

Air flow sensors

- Thermal flow sensor
- Signal processing circuits for flow sensors
 - Constant Power circuit
- Calibration



Collaborative work with Korea

- IMSAS to ENS Lab, PNU (Jan-April 2012)
- DASH7 IMSAS tag design started

DASH7 IMSAS tag

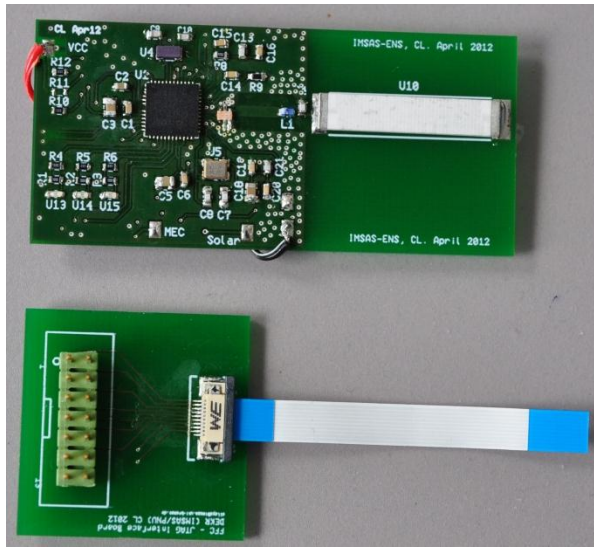
Why?

- Need for a fully flexible, in-house embedded system
- Dependency on others' HW solutions is not ideal
 - Time delays
 - Technical restrictions
 - Too many unknowns!
- Worth the initial time and resource investment
- Possibility to adapt with changing requirements
- Application in Intelligent Container project for airflow measurement, given its superior penetrative power, reducing communication protocol complexity

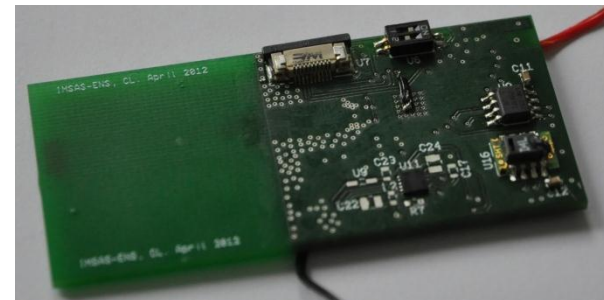
DASH7 IMSAS tag

- Miniature: 3 cm X 3.5 cm (without antenna)
- SoC CC430F5137
- Balun chip
- Chip antenna
- Dual power
- Micro(Milli)power charger/protector integrated
- Temperature/Humidity sensor – Sensirion Sht15
- 2 Mbits flash memory – replaceable with (8 Mbits)
- FFC/FPC JTAG connector/programmer
- We work with OT

MEC201 (1 mAh), 3V coin,
Solar panel



DASH7 IMSAS tag (top)
+
JTAG interface



DASH7 IMSAS tag
(bottom)

Demo on Day 2

- Proof-of-concept demonstration only

Future work

- Results of radio performance, energy harvesting, sensor integration, flow tag in 2nd issue of DASH7 UAG Magazine
- Field tests in Dec 2012 – Jan 2013 in IC project
 - 2.4GHz 433 MHz comparative studies
 - Tag will be used without the solar charging circuitry but with long-lasting, replaceable batteries
 - Also, Constant Power circuitry and thermal flow sensor will be integrated onto the tag, still retaining its small form factor

Thank you