

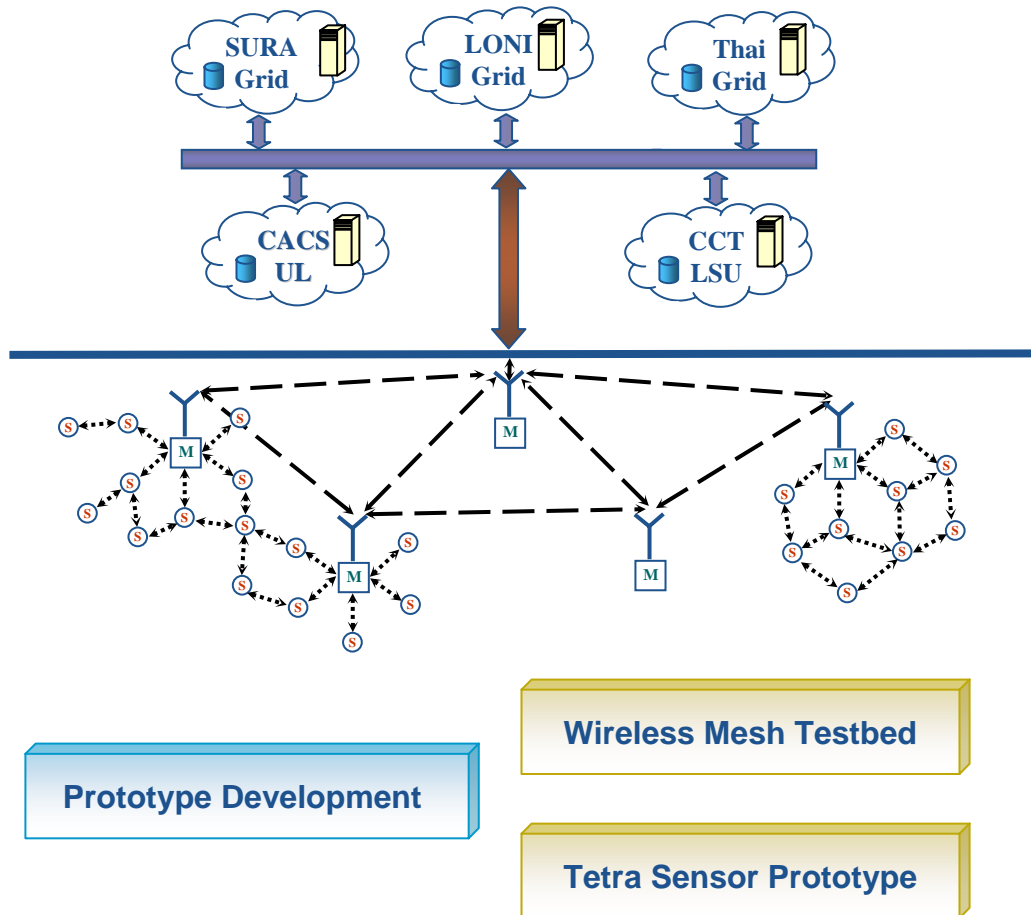
# Ubiquitous Computing and Monitoring System (UCoMS) for Discovery and Management of Energy Resources



**Testbed and Prototypes**

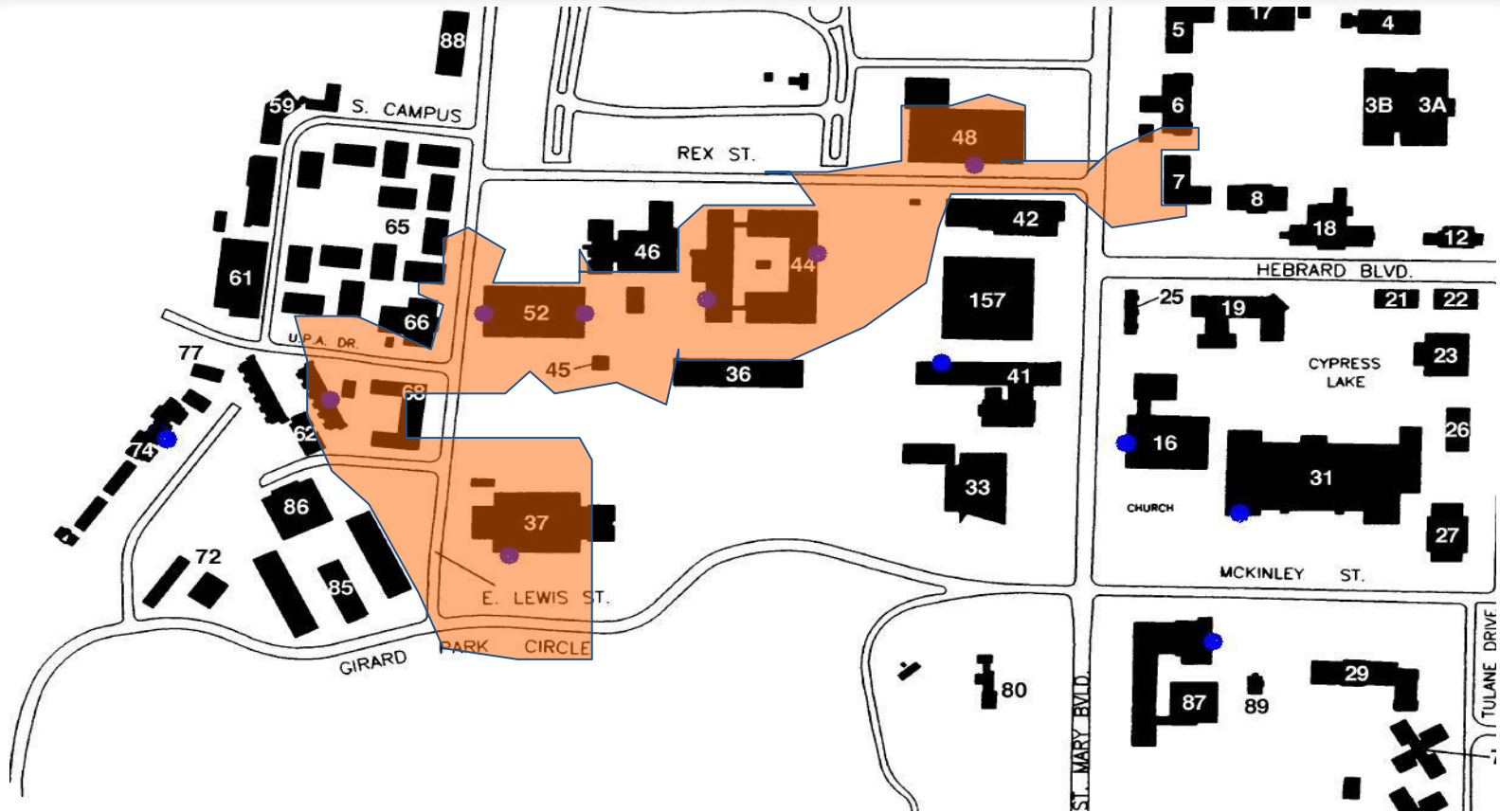


# System Overview





# Wireless Mesh Testbed



- Coverage Area
  - Phase I: 7 routes ~ 70 acres = 0.11 sq. miles
  - Phase II: 12-13 routers ~ 130 acres = 0.20 sq. miles

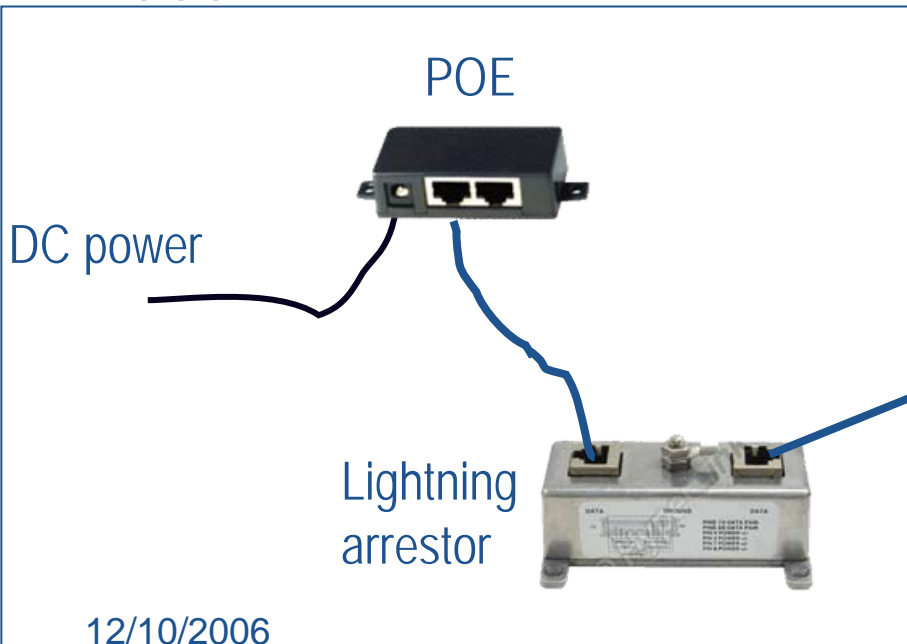


# Wireless Mesh Testbed

Rooftop



Indoor





# Wireless Mesh Testbed

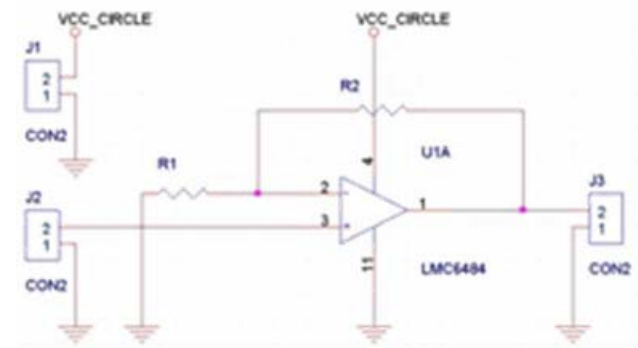
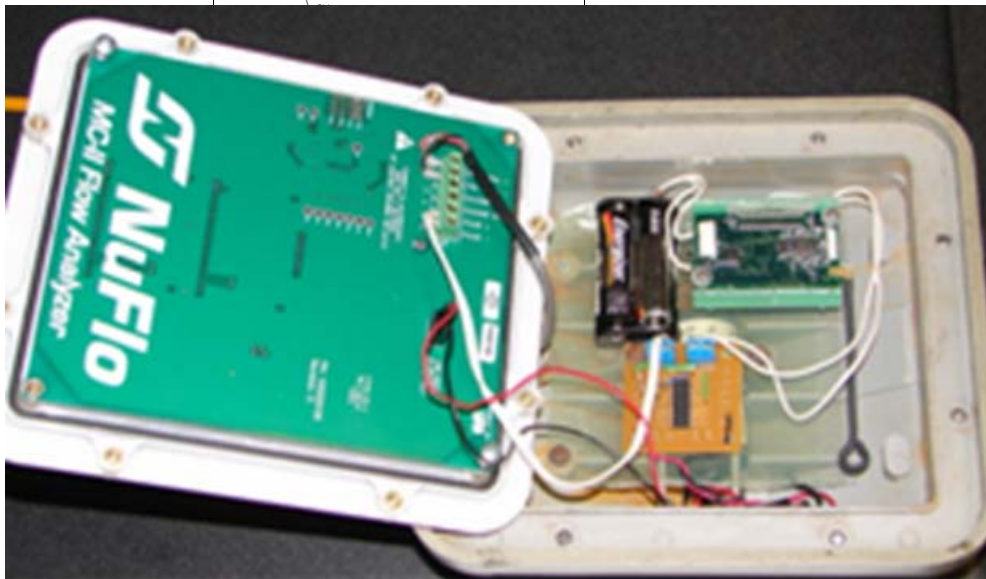




- TETRA Production Testing
  - Production testing of oil wells
    - Manual data collection process
    - Need for higher sample rate
    - Wired solution expensive

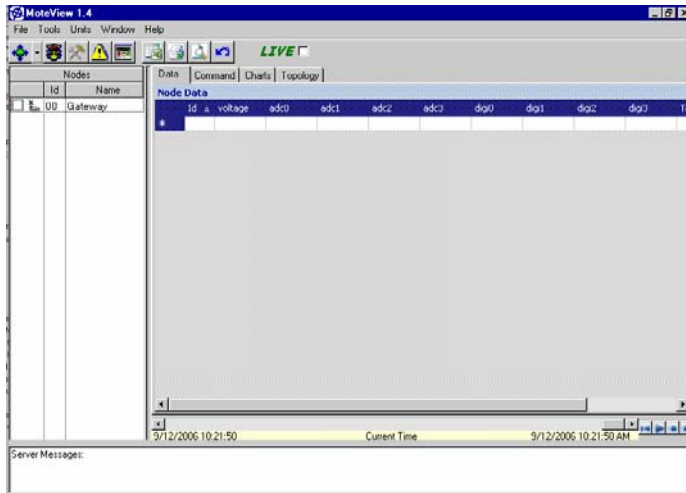


# Production Testing Prototype





# Production Testing Prototype



result_time	counter	Flow	VolPerClick	Units
7/25/2006 15:50	22	1985.5	90.25	BBL
7/25/2006 15:50	34	3068.5		
7/25/2006 15:50	43	3880.75		
7/25/2006 15:50	54	4873.5		
7/25/2006 15:50	66	5956.5		
7/25/2006 15:51	78	7039.5		
7/25/2006 15:51	87	7851.75		
7/25/2006 15:51	99	8934.75		
7/25/2006 15:51	111	10017.8		
7/25/2006 15:51	120	10830		
7/25/2006 15:52	131	11822.8		
7/25/2006 15:52	143	12905.8		
7/25/2006 15:52	154	13898.5		
7/25/2006 15:52	164	14801		
7/25/2006 15:52	176	15884		
7/25/2006 15:52	188	16967		
7/25/2006 15:53	196	17689		
7/25/2006 15:53	208	18772		
7/25/2006 15:53	220	19855		

**TETRA PRODUCTION TESTING SERVICES, L.P.**

Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 Co. Representative: \_\_\_\_\_  
 AFE#( W.O.): \_\_\_\_\_  
 PERFORATIONS: \_\_\_\_\_  
 PERFORATIONS: \_\_\_\_\_  
 TUBING SIZE &WT: \_\_\_\_\_

**FIELD DATA REPORT**

Lease: \_\_\_\_\_  
 Well No. \_\_\_\_\_  
 Field: \_\_\_\_\_  
 Date: \_\_\_\_\_  
 Time Well Open: \_\_\_\_\_  
 Time Well Shut In: \_\_\_\_\_  
 PACKER TYPE: \_\_\_\_\_  
 PACKER DEPTH: \_\_\_\_\_

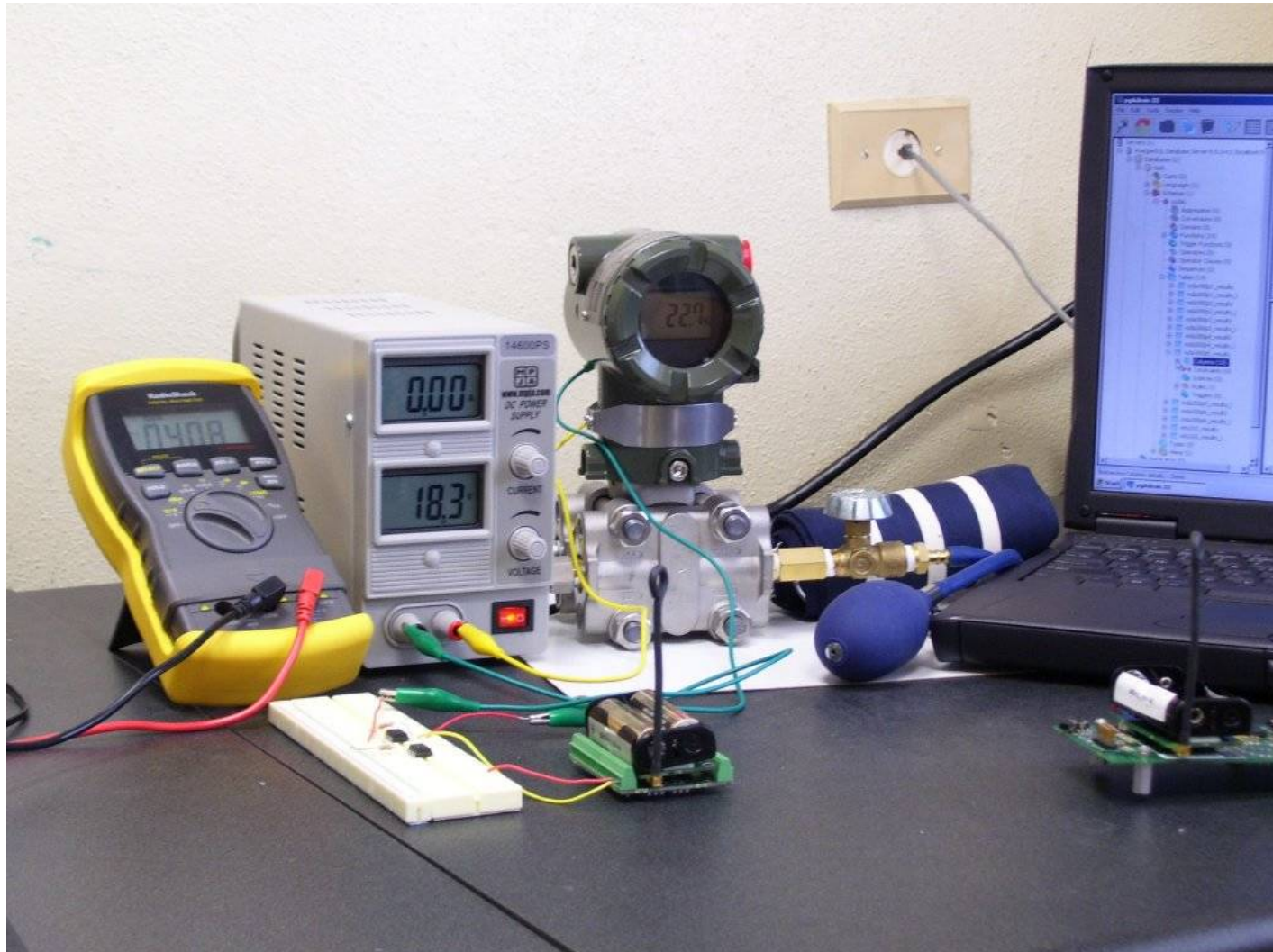
**TOTAL GAS CUMMULATIVE \_\_\_\_\_ MSCF**

Date & TIME	WELL HEAD				Heater	HIGH PRESSURE SEPARATOR						OIL					WATER					CUMM OIL		
	Pressure	W/H	Csg.	64THS	Temp	GAS METER RUN SIZE: 6			GAS	GasCumm	Meter	BOPH	BOPD	Gravty	GOR	OGR	Meter	BWPH	BWPD	H2O	PH		%	Water
MM/DD/YY HH-MM	Tubing	Temp	Press.	Choke	Deg. F	Press	Diff.	Plate	Temp	Rate mcf/d	MCF	BBSL	BBSL	BBSL	API	MCF/B	B/MCF	BBSL	BBSL	BBSL	Wt.			
7/25/2006 15:50																		1985.5	0.0	0.0				1.00
7/25/2006 15:50																		3068.5						
7/25/2006 15:50																		3880.8						
7/25/2006 15:50																		4873.5						
7/25/2006 15:50																		5956.5						
7/25/2006 15:51																		7039.5						
7/25/2006 15:51																		7851.8						
7/25/2006 15:51																		8934.8						
7/25/2006 15:51																		10018						





# Production Testing Prototype

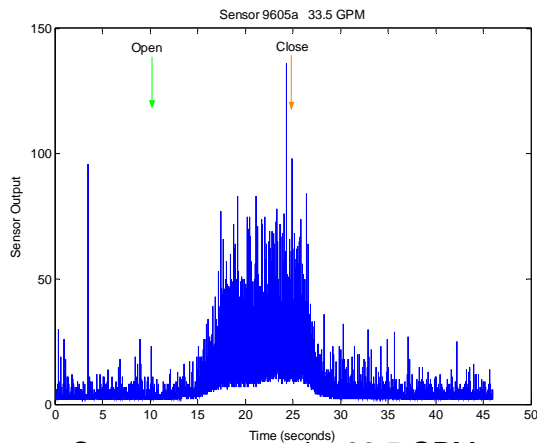




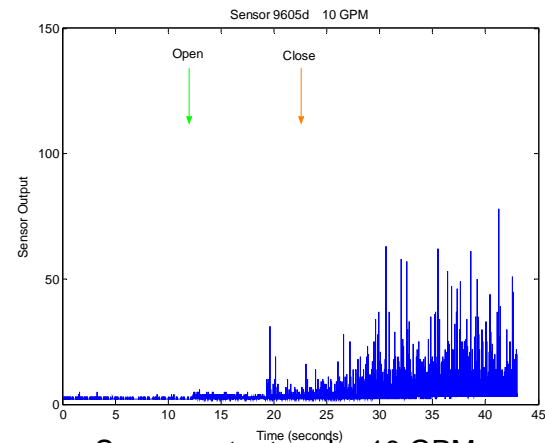
Siemens AS100 acoustic sensor.



Sensor data acquisition.



Sensor output under 33.5 GPM.



Sensor output under 10 GPM.