





**FlexNet AMI**  
**Solutions & Benefits**





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### About Sensus



- 100 Years in Business
- \$866 million of Net Sales
- Market leader
  - NA Smart Grid market
  - Global Water market
  - NA Gas market
- 4,000 employees
- 41 Worldwide Facilities
- Headquarters in Raleigh, N.C.





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### About Dana Kepner



- Premier provider of water meters, AMR and AMI systems in the state of Arizona, Colorado, Montana & West Texas
- Five branches located throughout Arizona.
- 50+ AMR and AMI accounts in the state of Arizona.
- Exclusive distributor of Sensus water metering products and parts.
- Located at our Phoenix location, we offer a full service meter shop




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**sensus**  
The Measure of the Future

# FlexNet

## Fixed Based Infrastructure

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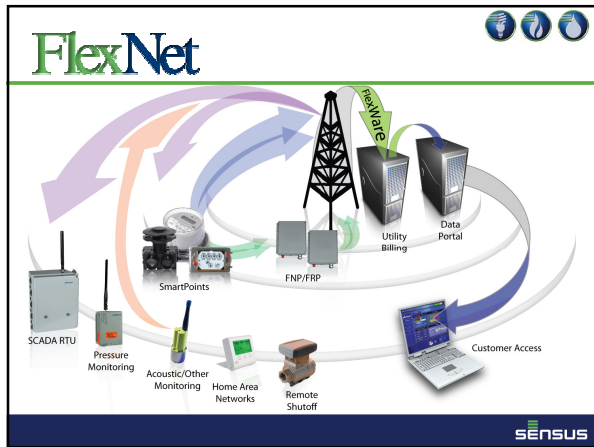
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### How Does FlexNet Fit In

- Increased Efficiency
  - Customer Service
  - Distribution
  - Production
- Proactive vs Reactive
- Guaranteed Performance

The image shows a vibrant green tree growing inside a single, clear water droplet. The background is a soft-focus green and blue, suggesting a natural environment. This metaphor likely represents the 'Guaranteed Performance' mentioned in the text.

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## Utility Billing Benefits

- Hourly Readings
- Consistent Billing Cycles
- On Demand Reads
- Dispute Resolution
- Enhanced Reporting





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## Sensus Analytics - Billing Interface Application

SENSUSANALYTICS    prv | WATER    mroeder@danakpner.com    logout


**Access**



**Insight**



**Foresight**




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## Head End System

Reports    Diagnostics    Tools    MDM    Administration    Search    Newer    Search

Meter Information    Meter Prager

FlexNet ID:	1322114	Meter Status:	Install Cycle: 7.0
Meter ID:	026030314	Location:	Crestview, FL
Type:	Water Meter, Fluorol Water	Position:	45.511330° -122.455800°
Firmware Revision:	Flanet 0.2.x		

From: 8/15/2010    Previous 30 Days    Readings Chart



**READINGS**

Latest Reading On:	2010-08-16 08:00:00
Latest Read Value:	4339 CF
Recent Change:	0.0
Connection Status:	Unknown

**ALARMS**

Broken Pipe:	No current or valid value.
Leak Detection:	No current or valid value.
Backflow:	No current or valid value.
Transformer/Tamper:	No current or valid value.
Cut Wire:	No current or valid value.
Low Battery:	No current or valid value.
Battery Voltage:	3.55625 V




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## Individual Meter Information - Hourly

Logged in as guest@cmh | log out | about FREDMETER

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The Meters of the Future

Reports Diagnostics Tools MCM Administration

search:

Meter Information Meter Finger

**Fieldset ID:** 1160336  
**Meter ID:** 08087600  
**Type:** Ultra-Smart Pallet Water  
**Firmware Revision:** PFCM1.1.5.x

**Meter State:**  
**Location:** Umatilla, OR  
**Position:** 45.918913°N, 119.295800°W  
**Install Cycle:** 7 / 0

From: 452070 Single Day Readings Chart

**READINGS**

Latest Reading On	2010-04-13 03:00:00
Latest Read Value	2507 g
Second Channel	0.0
Connection Status	Unknown

**ALARMS**

Broken Pipe	No current or valid value
Leak Detection	No current or valid value
Block Flow	No current or valid value
Transmitter Tamper	No current or valid value
Cut Wire	No current or valid value
Low Battery	No current or valid value
Battery Voltage	3.60025 V

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## Read Meters on Same Day

- Perfect 30 day billing cycles
- Read meters on holidays and weekends (retroactively)
- Process all readings on same day or even same hour

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## Available Reports

Utility Billing

- Master Route
- High/Low Read Exception
- Un-Read Exception
- Register Malfunction
- Bad Read
- Leak Detection
- Meter Mismatch
- SmartPoint Mismatch
- Consumption
- Consumption Exception
- Tamper Exception
- Statistical Summary
- Route Exceptions
- Alarms

Database Reports

- Error's – Malfunctions, Bad Reads, Leaks, Broken Pipe, Backflow, Low Battery Tamper, Meter Read Failures, Non Numeric Reads, Swapped Meters, Un-Reads, iPERL (Low Battery, Magnetic Tamper, Empty Pipe, Reverse Flow, Leak Detection)
- Consumption
  - Total Over Period of Time
  - Daily Over Period of Time
- Violations on selected days
  - Even, Odd or selectable days

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## Distribution Benefits



- Leak Detection
  - Customer
  - Distribution System
- Fewer  
Unscheduled  
Reads




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## Production Benefits



Application	Monitor	Control	Product
Tank/Reservoir Level Monitor with Control	<ul style="list-style-type: none"> <li>◦ Level</li> <li>◦ Pressure</li> <li>◦ AC Power to pump</li> </ul>	<ul style="list-style-type: none"> <li>◦ Pump (may be separate or multiple)</li> </ul>	T866 MicroRTU
Pump Monitor and Control	<ul style="list-style-type: none"> <li>◦ Pressure</li> <li>◦ Flow</li> <li>◦ AC Power</li> </ul>	<ul style="list-style-type: none"> <li>◦ Pump</li> <li>◦ Motorized valves</li> </ul>	T866 MicroRTU
Lift Station Monitoring and Control	<ul style="list-style-type: none"> <li>◦ Pressure</li> <li>◦ Flow</li> <li>◦ Level or level alarm</li> <li>◦ AC Power</li> </ul>	<ul style="list-style-type: none"> <li>◦ Pump</li> <li>◦ Motorized valves</li> </ul>	T866 MicroRTU
Meter SCADA			RTU + RTM Modbus
Remote PLC	<ul style="list-style-type: none"> <li>◦ Various analog, digital points</li> </ul>	<ul style="list-style-type: none"> <li>◦ Various control outputs</li> </ul>	RTM Modbus




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## Distribution Automation (DA)



POWER VISTA™

### Take operations from the blacktop to the desktop

- Remote Telemetry Module (RTM)
  - FlexNet and Cellular
  - Modbus protocol support to interface with PLC/controls
- MicroRTU T866
  - FlexNet and Cellular
  - 8 digital inputs (including pulse counters)
  - 6 analog inputs
  - 6 control outputs




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# FlexNet

## System Performance

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### Guaranteed Performance

- Propagation Study
- Phased-in Deployment
- System Redundancy
- Migrateable Technology




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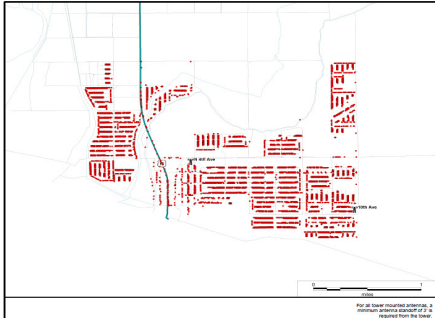
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### Propagation Study



**FlexNet Design**  
 Propagation Analysis  
 San Luis, AZ  
 City of San Luis

RF Engineer: Kris Krahenbuhl  
 Date: 05/09/14  
 Version: 1


**BTS and Meter Locations**

1. 5,232 Total Meters
2. 5,091 Geocoded Meters
3. 361 Non-Geocoded Meters

FSK: 13  
 Meter Type: Water  
 SmartPoint Location: PO-Set

**LEGEND**

- 510
- Meters




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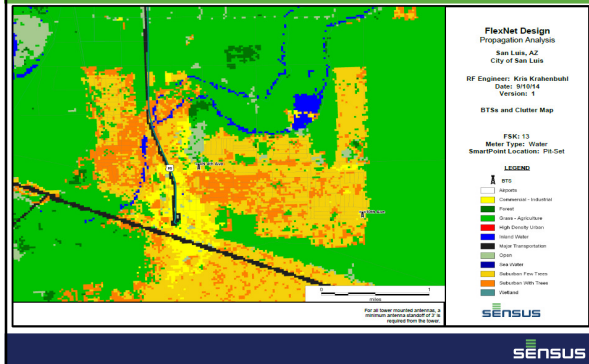
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# Propagation Study




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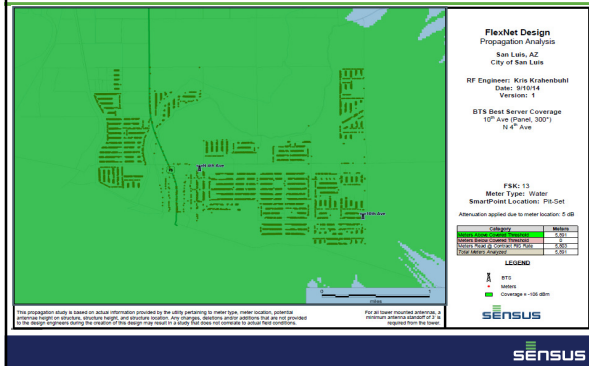
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# Propagation Study




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# Propagation Study

Customer Name:	City of San Luis	9/10/2016	Uplink	RF Engineer:	
City/State or Country:	San Luis, AZ	Water		Version:	
Number of Meters Analyzed:	5,391	Pk-Set		FSK and Attenuation Value:	

BTS Name	Latitude	Longitude	Proposed Antenna Centerline (Feet)	Base Antenna Type	Base Antenna 3dB Beamwidth (Degrees)	Base Antenna Azimuth (Degrees)	Preferred Antenna Installation Azimuth (Degrees)	Meters Above Covered (Threshold)	Meters Below Covered (Threshold)	The meter counts indicated to the individual sites are cumulative in nature, and coverage totaling is correct.	
10th Ave	32.489827	-114.752736	60	WPA-70049-6CF-EDN-2	41	300	Top of Tank	5.891	0		
V 4th Ave	32.490488	-114.739897	40	BCD-69803-EDN-0	Omni	Omni	Top of Tank	5.852	39		
<b>Best Server Coverage</b>	*****Best Server Coverage is the Composite Coverage for all above sites proposed*****								5.891	0	
<b>Meters Read @ Contract RCS Rate</b>										5,883	

Notes:  
 Note: Study was run using Pk-Set Water meter parameters.  
 Note: Used Pk-Set 3.0 as the default model and parameters at 13 FSK with 5dB attenuation.  
 Note: V1 Meter file had 6,252 total meter addresses. 5,391 addresses were Geocoded. 361 addresses were Non-Geocoded (see tab below).

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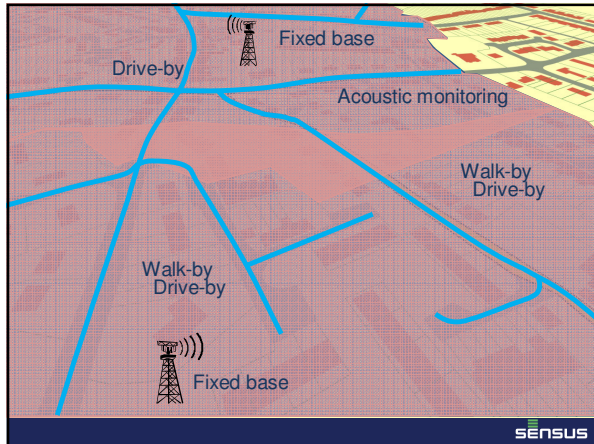
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### System Redundancy and Resiliency

Best of Breed Endpoint	Highly Reliable TGB	Redundant RNI
		
7 Days Storage 2 Channels	30 Days Storage If Backhaul Lost	13 Months Hourly Data Storage
History Reads In Every Transmit	8 Hour Back-up If Power Lost	

Redundant Backhaul

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### Migratable SmartPoint Output

- 2 Watts Primary Use Licensed Frequency
- Full 2-Way Operation
- Fully migratable to Fixed Based Reading
- Capable:
  - Leak Detection
  - 35 Days of Hourly Reading Storage
  - Reverse Flow Detection
  - Broken Pipe Detection



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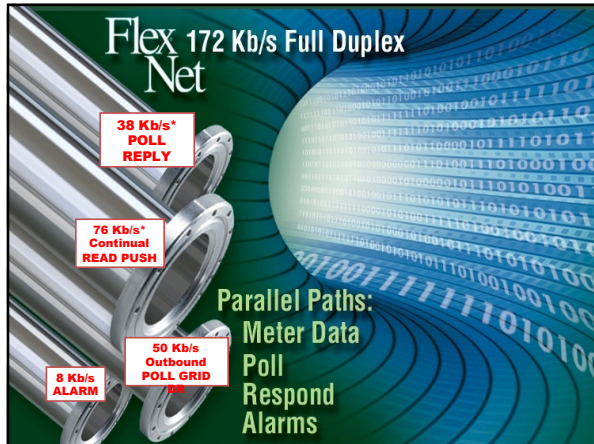
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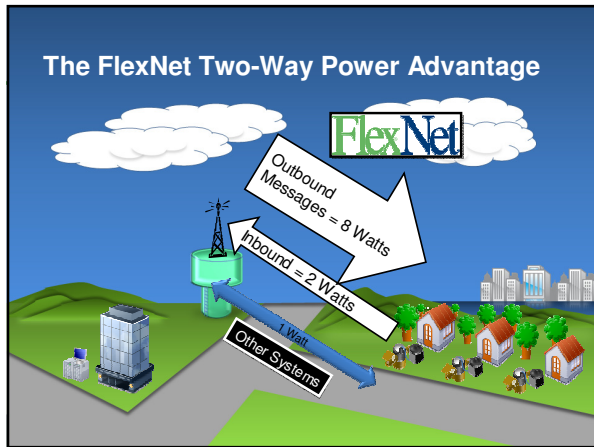
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## 2-Way Communication

- **Demand Reads**
  - Move In/Out
- **Top of Hour Reads**
- **Remote Firmware Upgrade**
  - Software Definable Radio
- **Remote Endpoint Reprogramming**
  - Leak/Reverse/Broken Pipe Detection
  - Transmission Mode
- **Telemetry**
- **Remote Disconnect – Future**

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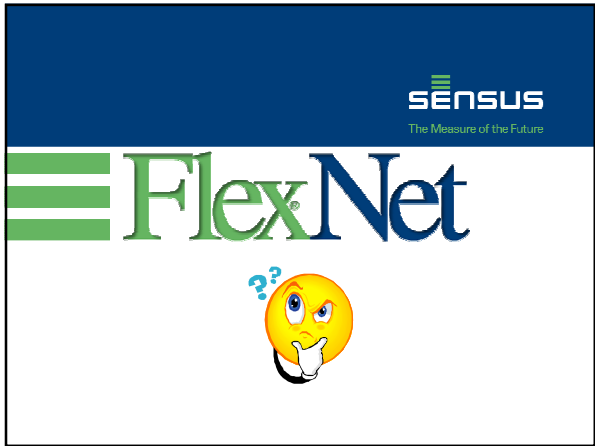
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