

Extremely Flexible & Reasonably Priced Communications for Flood Warning Systems, Hydrological Monitoring & Control Networks, Automatic Weather Stations & More

## GSM/GPRS COMMUNICATIONS

- ▶ Provides real time data from current hydro-met measurements to users of GSM/GPRS networks.
- ▶ Robust, reliable, broad-based GSM/GPRS communication system that sends data in **text & image formats**.
- ▶ The GSM/GPRS network automatically gathers data as & when needed at user-defined time intervals and stores the data in the Server for analysis.
- ▶ Stations are configured to call the Server phone at user-specified times to transmit the GPRS message. If the transmission isn't successful, the station will retry transmission for a user-defined number of times. If the transmission in GPRS mode fails after x number of retries, each station switches over to GSM mode to transmit data.
- ▶ Each station includes a GSM/GPRS control terminal with everything needed for **wireless M2M capabilities** & to avoid delay in data reception caused by network congestion.
- ▶ Each GSM/GPRS RTU sends an automatic message at user selected intervals ( i.e., every 10 minutes) to the Server. Sampling is programmable at intervals, 0 to 60 minutes.
- ▶ Data is transmitted in ASCII format to a Central Server. Data can also be routed to an **e-mail** address or sent as a **UDP** packet in GPRS to an address and port, that can be programmed via **SMS**.
- ▶ Each station can log & store data locally in flash memory, then later retrieve detailed logs.
- ▶ The Central Server has the ability to answer calls & communicate data using a **synthesized voice (any language needed)**.
- ▶ The System also **responds to SMS requests for current data**.
- ▶ Provides automatic SMS alarms set at programmable levels for any parameter needed.



### USE A GPS ANTENNA

The GSM Modem includes an integrated GPS Modem. Therefore, the station antenna is GPS which not only keeps station time accurate but eliminates the need for two separate antennas. The Sutron antenna is an integrated unit that receives GPS signals as well as Quadband RF signals.

- ▶ Sutron also provides System Software to manage the GSM/GPRS Network for troubleshooting & to return functionality in order to dramatically minimize down time.
- ▶ The System can display data & export data to Excel, Matlab & similar applications for graphical representations.
- ▶ Both the Server & Station Data Loggers are programmed to provide **event-triggered information & alarms** for sudden developments such gusts, squalls, thresholds of rainfall, rise in water level, current changes, etc.
- ▶ All data received in the Central Server is in standard exchangeable RDBMS format using SQL Server or Oracle. Each Station has the facility to be queried at any moment or at any intervals, regarding any parameter or sensor. GUI Server Software includes a statistical tool.
- ▶ Sutron will provide GSM/GPRS Service through the most reasonably priced Provider available.

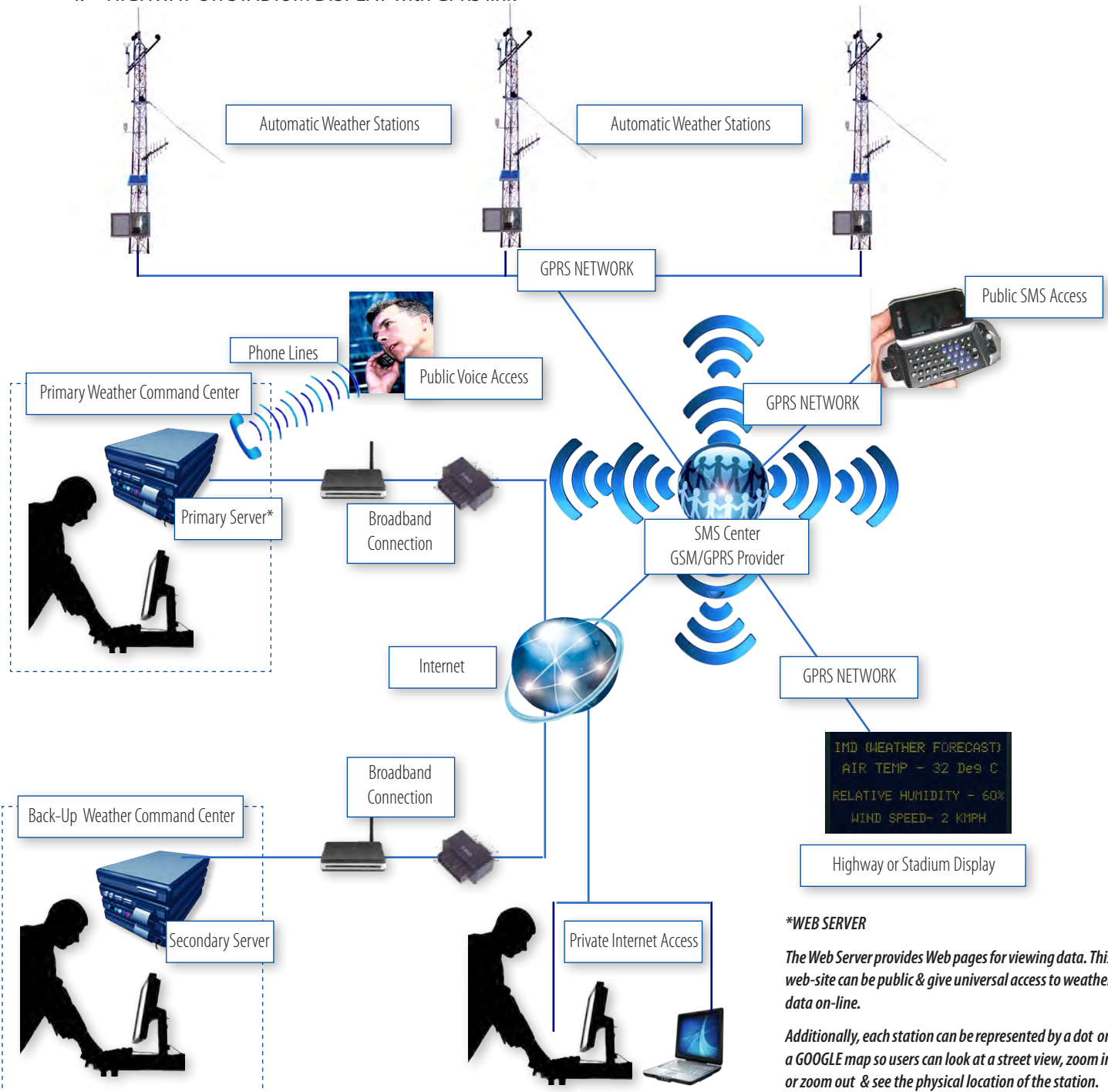
# WEATHER SYSTEM APPLICATION



2009

This example consists of the following elements:

1. Weather Command Center with PRIMARY SERVER including MAIN SERVER, VOICE/SMS SERVER, HUB, FIREWALL & ROUTER.
2. SECONDARY SERVER Site with MAIN SERVER, VOICE/SMS SERVER, HUB, FIREWALL & ROUTER.
3. WEATHER STATIONS with GPRS & SMS links
4. HIGHWAY OR STADIUM DISPLAY with GPRS link



**\*WEB SERVER**

The Web Server provides Web pages for viewing data. This web-site can be public & give universal access to weather data on-line.

Additionally, each station can be represented by a dot on a GOOGLE map so users can look at a street view, zoom in or zoom out & see the physical location of the station.

# DATA DELIVERY



2009

## MOBILE DEVICE (CELL PHONE, BLACKBERRY...), CSD, FAX

- ▶ Frequency: 900 / 1800 MHz
- ▶ GSM/GPRS Modem: Wireless M2M capability
- ▶ Remote Dial-Up Facility
- ▶ Transmission: Quad band design allowing for applications to be deployed worldwide
- ▶ Point-to-point mobile originated & mobile terminated SMS
- ▶ Concatenated SMS supported
- ▶ SMS cell broadcast
- ▶ Text & PDU modes
- ▶ CSD V.110: Asynchronous transparent circuit switched data (CSD) up to 14.4 kbps
- ▶ Asynchronous non-transparent CSD up to 9.6 kbps
- ▶ FAX V.110
- ▶ Embedded TCP/IP stack including TCP, IP, UDP, SMTP and FTP
- ▶ Sim Card 1.8V/3.0V, Externally accessible

## AUDIO & VIDEO

- ▶ Full voice, SMS, Data
- ▶ Half rate, full rate, enhanced full rate & adaptive multi-rate voice codecs
- ▶ Telephony, emergency call
- ▶ HR, FR, EFR, AMR
- ▶ Superior echo cancellation & noise reduction
- ▶ DTMF
- ▶ 24-7 Web Cam with swivel control from password protected account

## UDP & TCP/IP (INTERNET)

- ▶ Public data internet & SIP Trunk for phone lines. Failures in any part of the primary site or its connections can be overcome by the secondary server site. Of course, it costs more for the secondary site to duplicate the primary site. However, this duplication is the only way to make sure that the system can continue running in spite of failures.

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IMD WEATHER FORECAST CENTER
SUNNY ZERO CHANCE OF RAIN
AIR TEMP - 43 DEG C
HUMIDITY - 40% HRS OF SUN 8
```

## ALARMS & DATA MESSAGES

- ▶ Voice alarms & messages
- ▶ Text alarm messages to mobile devices & email
- ▶ Internet alarm communications & reports
- ▶ Sirens & public announcements
- ▶ Public data access using the Internet
- ▶ LED Displays: External public announcement "slave" units for big screens ; displays more than 8 parameters
- ▶ Public data access using SMS.

The Voice Response System Server also handles SMS messages. It has a high speed connection to an SMS Center (SMSC) & uses SMPP to talk to the SMSC to reduce message charges. Incoming SMS messages are received through the SMPP interface to the Messaging Server. A script on the Server identifies the request and creates the reply message. For example, a user sends a text to the System phone number. The System then builds a reply message from data in the database and responds. Test drive it! Please dial up our SMS Demonstration Automatic Weather Station.

## WMO MESSAGE FORMATS

- ▶ Sutron uses the following as references for WMO Software & configuration of our Automatic Weather Stations (AWS):
  - WMO Publication No. 8, 6th Edition, 1996.
  - WMO Publication No. 9, 1993 & supplements
  - WMO Publication No. 49, Technical Regulations
  - WMO Publication No. 100, 1990.
  - WMO Publication No. 305, 1993
  - WMO Publication No.306
  - WMO Publication No. 636,1998