

Long Term Monitoring Workshop Data Handling

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Outline

- Sensor/DCP/instrument collects data at LTM site
- Transmit data back to office
- Reduce data
- Report



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Remote Data Transmission

- Wireless Spread Spectrum (IEEE 802.11b)
- Wireless Spread Spectrum Radios
- Cellular technologies
- Satellite



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Wireless Spread Spectrum (IEEE 802.11b)

- Good application for “within site” connectivity
 - ✓ Connect multiple data collection points to an onsite central server
 - ✓ Reduced costs by consolidating to one uplink
- Hardware is now widely available and includes encryption capability
- Range is up to 2000 feet in open space
 - ✓ Increases to over one mile with high gain antenna and good line of site



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Cellular Technologies

- Cellular Digital Packet Data (CDPD)
 - ✓ Uses a cellular modem
 - ✓ Requires access to any cellular tower
 - ✓ Relatively slow - 14.4 kbps
- 3rd Generation Wireless technology
 - ✓ Uses an “Air Card”
 - ✓ Requires access to a digital cellular tower
 - ✓ Speed ranges from 50kbps up to 144 kbps



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Wireless Spread Spectrum Radios

- Range of 30+ miles
- Speeds up to 115.2 Kbps
- Connects to a PDA or laptop via serial port
- Currently utilized in field with solar power panel and battery
- Vendor website: <http://www.freewave.com/>

Reference: Long Term Ecological Research Network
(www.lternet.edu)



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Satellite Communication

- Provides Internet access anywhere in North America
- Speeds up to 1.5 Mbps
- Most expensive alternative
 - ✓ Installation fee(s)
 - ✓ Monthly subscription
 - ✓ Equipment rental
 - ✓ Requires generator or 110 power

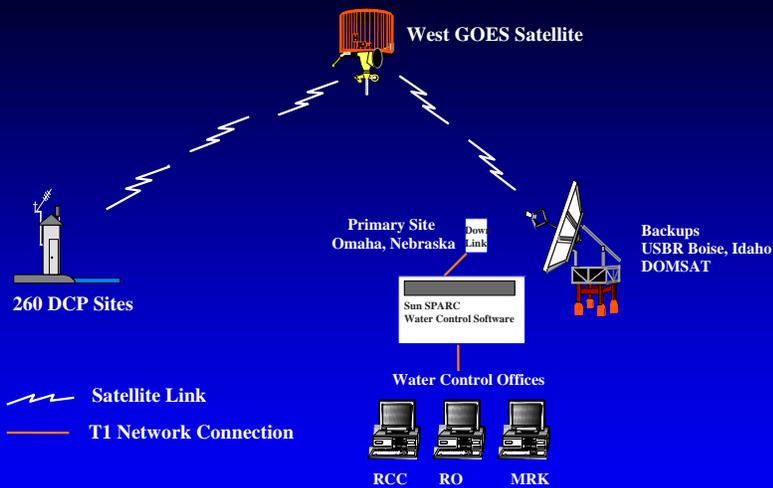


Reference: <http://www.tachyon.com/>

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River Gauge Data Collection



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Reduce Data

- Data file transmitted to database/webserver
 - ✓ File Formats
 - ✓ Parsing Data into Database
- Reporting



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File Formats

- Flat Files
 - Fixed Field Length
 - Delimited*
 - Tagged* (XML = <tag>value<tag/>)
 - Normally flat files are plain text
- Relational Database file
 - Linked, keyed and/or indexed
 - Examples; Tables for Oracle, Access, dBase, Foxpro, etc
- Special Files
 - Examples; Word, Excel and other similar files



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Parsing Data

- Data file from field parsed/loaded into spreadsheet
 - ✓ Excel imports flat/ascii files easily
 - ✓ Not recommended for keeping large amounts of data
- Data file from field parsed/loaded into database
 - ✓ Requires parsing program to import data file
 - ✓ Ideal for storing large amounts of data



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Reporting

- Allow users to view data via webpage
- Provide/share data using an agreed upon electronic data deliverable or EDD
- Generate a user defined report specific to their requirements



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Conclusions

- Today's technology provides several options for retrieving LTM data from the field
- Data formats like XML and text files can be easily loaded into database and spreadsheet software
- Once data is loaded into the database or spreadsheet, detailed reports can be generated



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