

# LTER Technology Committee Report

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The LTER Technology committee has not met since an executive session in 2001. However, the LTER Network as a whole, and the LTER Network Office have investigated and implemented a number of technology related items listed as important for LTER in the previous LTER Technology Committee report. This report can be accessed at: <http://www.lternet.edu/technology/2001techtask/>.

Some specific items of interest to the LTER Network, including interests related to potential NEON efforts:

- **Automation of site measurements** – this is a continuing effort, currently aided by inexpensive wireless data transmission technology. Wireless “routers” available from a many suppliers can be found in the \$100-\$1000 range. A number of LTER sites have implement forms of wireless data links including North Temperate Lakes, Luquillo, Bonanaz Creek, Sevilleta, and Virginia Coast Reserve sites. More information can be found on the LTER technology page at: <http://www.lternet.edu/technology/> or specifically at: <http://www.lternet.edu/technology/wireless/>. In addition, two LTER Network Office coordinated “Wireless Workshops” funded by a supplement from NSF will be held in April and May of 2002 at the Sevilleta Field Station.
- **Long range digital serial data transmission** – A number of sites use digital serial transmission for longer range data transmission. Distances as far as 30 miles, line of site, can be covered at about 128kb/sec data rates. The LTER Network Office has a pair of these “FreeWave” systems which can be borrowed for site tests.
- **Cellular digital packet data (CDPD)** – data transmissions in remote areas can sometimes use existing standard cellular data technology. This CDPD network works in conjunction conventional cellular systems by a number of cellular service providers. The LTER Network Office has used CDPD computer modem technology for about two years with fairly good results primarily in major US cities, although current data rates are limited to about the same speed as conventional phone line modem speeds (about 28 kb/s).
- **Automated camera systems** – Standardized fixed and pan/tilt/zoom internet-based camera systems currently exist for automated monitoring of field sites. A camera from Panasonic, in the range of \$1500 is a popular choice for a pan/tilt/zoom system. John Porter has implemented a similar camera system within their wireless data transmission efforts at the VCR site. A combination of an AXIS camera server and Sony pan/tilt zoom camera also work, but require some setup expertise and more specialized housing system. Internet based camera systems from AXIS Communications permit simple web-based image transmission. An example is used at the Sevilleta Field Station, the Sevilleta Web-cam, a simple camera in a weather-resistant “Pelican” case, connected to 12v DC power and hard-wired internet connection. Check it out via the LTER School-yard web site at <http://schoolyard.lternet.edu/includes2/desierto.html>. Similar camera systems (with adjustable zoom and auto-iris capability) are being implemented at the Coweeta and Short-Grass Steppe LTER sites as part of the LTER Schoolyard project. A new camera system by “Data-Link” incorporates a wireless 802.11b transmitter and camera in one unit. A more advance camera system used at the Niwott-Ridge LTER site, incorporates a commercial software-drive system based on a Sony pan/tilt/zoom camera which permits automated site monitoring as well as a user-interactive web interface. This system can be accessed at: <http://tundracam.colorado.edu/>
- **Portable computer technology for field notes** – Some of the newer Palm, or Pocket-PC portable devices are becoming more useful for field data collection. The large memory capacity of the various Pocket-PC devices permit digital voice recording, wireless internet connections and easy transfer to devices such as flash memory cards or flash “hard disks” that have current data capacities as high as 2gb. GPS devices in flash memory form factor can also be attached. Connection to serial data links, IR “data beaming” and other data transmission permit other forms of data transmission. In mid 2002, a newer version of the standard CPU for the pocket PC

devices will be released, permitting longer battery life, which is always a problem in these portable devices.

- **Real-time communications** – this covers a number of areas, from field data transmission to digital teleconferencing. The LTER Network Office has investigated a number of wireless technologies. It is in the process of implementing new standardized internet teleconferencing. The systems, based on standard POLYCOM teleconferencing systems permit direct video teleconferencing of standard internet connections. Check out information at:  
[http://www.polycom.com/products/video\\_family.html](http://www.polycom.com/products/video_family.html) . The standardized H.323/H.320 protocols permit either internet connections or use of the older ISDN technology for 15 fps video connections. The displays can be standard television monitors or video projection systems.
- **Small-package GPS systems** (animal observation/tracking) – The size of commercial GPS systems is approaching the range where the devices can be placed on larger animals. Specialized systems already exist for smaller applications. GPS units in “flash memory” package devices are now available off-the-shelf for Palm and Pocket-PC devices.