



## JAMES SAN JACINTO MOUNTAINS RESERVE



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Jan Poley  
ADEC Consortium

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Dear Jan,

This letter is to confirm our intent to participate in activities related to the American Distance Education Consortium. As we have discussed, the James Reserve is extensively involved via its participation in both the CENS: Center for Embedded Networked Sensing, NEON: National Ecological Observatory Network, and the OBFS: Organization of Biological Field Station, in research to explore the application of embedded networked sensing systems in ecology. Our field laboratory was one of the first in the US to deploy networked wildlife webcams at feeders and in nest boxes that allowed students, teachers and the public to interact with birds from their classrooms and desktop computers. Today, our ecosystems and many organisms are continuously monitored by hundreds of micro sensors and imagers that track minute by minute fluctuations in energy, chemical and environmental variables at multiple scales from underground, in streams and ponds, within vegetation and above the canopy. These highly networked data streams and associated backend cyberinfrastructure, are used by scientists and educators throughout the world via innovative geoportals including Google Earth.

While our own users represent a sizeable on-line community, it goes without saying that we have barely scratched the surface in terms of potential new users and adopters for the products of ecological observing systems as demonstrated in the James Reserve prototypes. Collaboration with larger communities of distance educators such as ADEC, will broaden the diversity of users and uses, significantly expand the overall numbers of users, and provide essential feedback into the engineering of embedded systems and the scientific research that can be accomplished.

We look forward to a rich and productive collaboration.

Best regards,

Mike Hamilton, Director

## **Collaboration Opportunities between the American Distance Education Consortium and the University of California James San Jacinto Mountains Reserve**

A convergence of interests now exists between engineering and applied research centers that are developing new ways to “sense” the natural world using wireless embedded sensors, the ecological community that is eager to use these new tools to understand the complexities of climate and land-use change, and the educational practitioners who are advancing the uses of high speed networks to bring about high quality, economical distance education programs and services to diverse audiences.

The UC James Reserve provides the pristine backdrop for testbed engineering and embedded networked sensing measurement activities by both CENS: the Center for Embedded Network Sensing, based at UCLA, and NEON, the National Ecological Observatory Network. Our Terrestrial Ecology Observing Systems group, or TEOS, have deployed a large number of fixed and mobile (robotic) sensing systems that monitor climatic variables, energy flux, CO<sub>2</sub> flux, flowering and vegetative growth, below ground root and fungal growth, and avian observations of behavior and reproduction in relation to habitat location and microclimate. Prototype NEON instrumented systems are also in place and being developed for deployment across the NEON network in the years to come. Opportunities for educational access and uses of real-time and archival data from these embedded systems are seemingly unlimited, and while both CENS and NEON will support educational activities in the future, is not unrealistic to begin tapping into this potential today.

With this in mind, we propose a new collaboration between James Reserve researchers and engineers and ADEC members in the form of an on-site workshop that would inform the ADEC communities of the availability of data and experimental systems, and explore the needs and opportunities for distance learning using these technologies. This collaboration may also lead to new investment in programming and interface designs of James Reserve data to provide access to the large educational user communities in fundamentally new ways. There is a vast potential to engage a new cadre of citizen scientists that assist researchers via volunteer participation with research that are fundamentally electronic and network-based. Classification of sounds and images, quality control and calibration of sensors, model validation and event detection, are a few of the many ways that a network of users can provide assistance to investigators working at the James Reserve. We view this emergence of a citizen cyber-investigator as providing the means to improve the future of global environmental monitoring programs.