

COMMUNICATIONS IN THE AUGER OBSERVATORY

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The large coverage area and widely dispersed nature of the 1600 water Cherenkov detectors that form the surface array made a communications system based on radio technology the only economically viable solution. The system is based on a 2-layer hierarchy; a high capacity 'backbone' layer supports communications from the Fluorescence Detector sites and provides a series of collection points for data from the lower 'concentrator' layer that services the surface detectors directly. The backbone network uses a standard 34Mbps telecommunications network architecture based on commercially available microwave point-to-point equipment. However, the need to provide many links over the long distances to the surface detectors using a minimal amount of power offered some unique equipment performance challenges that could not be met with existing communications equipment. To fulfil this requirement, a low-power custom wireless LAN transceiver has been designed specifically for use in the concentrator layer at the surface detector sites. The characteristics and performance of this radio transceiver will be described. The reliability of the radio network is of critical importance to the data taking operations of the Observatory. Consequently, a campaign of on-site radio frequency (RF) measurements has been undertaken to gain an in-depth understanding of the expected performance of the radio network, prior to deployment at the site. This campaign has been augmented by a detailed series of RF propagation modelling exercises, using digital elevation maps of the site, in conjunction with standard radio propagation models, to produce highly detailed radio coverage maps that will greatly assist in the design of the layout of the final radio network. The process of deriving and utilising these maps will be described.