

DATA COLLECTION, ANALYSIS AND MODEL VALIDATION OF  
LOW-ALTITUDE PROPAGATION FOR VHF MOBILE RADIO

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The Advanced Propagation Model (APM) is a terrain and atmosphere-sensitive radio propagation model that was developed by the Navy. Validation studies of the APM, where APM predictions are compared against measured data, have shown close agreement in some cases with lesser agreement in others. The objective of this study presented here is to provide additional validation data for the APM, and to focus in particular on the effects of atmospheric ducting.

To meet study objectives, a data collection site was selected where refractive index profile data were routinely measured, where atmospheric ducting would be a predominant propagation mechanism in the event that ducting occurred, and where atmospheric ducting would be likely to occur. A site that meets these criteria is in the vicinity of Albany, New York, and that is where the data presented here were collected. The approach used to measure VHF signal strength over a range of conditions was to install a calibrated receiver and GPS in a vehicle, and then travel repeatedly in the region identified to be appropriate for data collection. Using this approach, each collection effort provided thousands of data points consisting of measured signal strength as a function of receiver position. Those data points were subsequently compared against estimates provided by the APM to assess accuracy.

Data were collected over a range of weather conditions and at different times during the day. Attempts were made to collect some of the data at times most likely to coincide with atmospheric ducting conditions, although the existence of those conditions could not be confirmed until after the measurements were made. As it turned out, ducting conditions did not exist during any of the times that data were collected for this study. Consequently, the primary significance of this work is to provide additional validation data for the APM and to document a baseline for normal-propagation signal levels along with a methodology for performing future work in this area in the event that further exploration of APM sensitivity to the refractive index profile is pursued.

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