2.4.2 Integrating GIS in Highway Economic Requirement Analysis Tools for State DOT's

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The Highway Economic Requirement System (HERS) Model was developed in response to Congressional and Executive branch interest in having FHWA and state agencies address economic as well as engineering criteria when considering future highway infrastructure investment requirements. The state DOT version of HERS, HERS-ST model is an engineering and economic analysis (EEA) tool that uses engineering standards to identify highway deficiencies, and then applies economic criteria to select the most cost-effective mix of improvements for system-wide implementation. The analytical engine of the HERS-ST software is developed and maintained in a DOS-based operating environment written in FORTRAN software language. In addition to the deployment of a GUI interface, the key innovation of this project is to integrate a GIS module as an integral part of the application so that data Q/C and analytical results, such as network deficiency and improvement requirements under various budget constraints and funding periods, can be displayed in the GIS environment. Prior to integrating a built-in GIS module, an analyst would need to prepare an input database (including Q/C) from a state highway inventory data table that would require significant preprocessing efforts before an analysis run could be performed. Using the GIS module, the analyst can select a corridor, a district or entire state database, view the data gap and errors, conduct Q/C assessment, make necessary corrections, and submit then input data to be used by the HERS-ST analytical engine. The GIS module is independent of any commercial GIS software and is used within the analytical module without having any GIS software installed. The HERS-ST GIS module uses a third party Active-X GIS control and integrated as part of the GUI with interaction with ESRI spatial data structure (shape file).