7.4.1 GIS-T Integration with the Atlanta Regional Commission (ARC) Congestion Management (CMS) Information System

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The Atlanta Regional Commission's (ARC) Congestion Management System (CMS) is a process for providing information on the performance of transportation systems. It is a decision-support tool for selecting alternatives and strategies to effectively and efficiently manage and operate transportation facilities in order to enhance mobility and address traffic congestion problems. One of the primary tasks of this project is to continue the development of an integrated GIS-T CMS by Integration of the DLGF centerline network with the TP+ model network.

The TP+ travel demand network is composed of three basic databases, a node database that has XY coordinates, a link database that stores all the characteristics of the facilities, and a traffic analysis zone (TAZ) database that contains demographics and trip information. Therefore the TP+ model network is sometimes referred as a "stick network". In order to make use of the road characteristics in the DLGF centerline network in the TP+ model network, it requires conflating these two networks before integration.

Network conflation is a challenging task. Currently there exists no fully automated method for achieving this complex task. Therefore, it is often a labor-intensive and time-consuming process. Most network conflation projects are performed by matching two different geometries and then copying attribute data from the less accurate geometry to the more accurate geometry. This approach normally requires significant user interactions in identifying matched nodes and links between the networks. For this project, a more efficient approach of integrating the DLGF centerline network with the TP+ model network was developed. First, the project team designed a method and developed a custom GIS tool to match the TP+ model network nodes to their corresponding nodes in the DLGF centerline network. We then developed additional custom GIS programs to automatically find the shortest path on the DLGF network that corresponds to each TP+ model network link between its A-node and B-node. Unlike the time-consuming manual matching method used in conventional network conflation methods, we instead created two relationship tables to record the matched nodes and the matched links between the DLGF centerline network and the TP+ model network. This innovative approach proved to be very effective and efficient in accomplishing the task objectives and resulted in a high percentage of matched records.