

## **ABSTRACT**

San Antonio in Bexar County is the seventh largest-populated city in the United States, and resides centrally in the state of Texas (United States Census 2010). Texas ranks first in total roadway miles by ownership, with over 300,000 roadway miles built for public use (United States Census 2012). With such a vast roadway infrastructure comes many critical problems including wrong-way driving (WWD), the focus of this study. An Environmental Systems Research Institute (Esri) ArcGIS geoprocessing task, Closest Facility, utilizing Network Analyst 10.1 extension has been customized to create a Wrong-Way Driving Transportation Model (WWD Model) (Esri 2013). This model directly addresses several key challenges faced by the San Antonio Wrong Way Driver Task Force (herein referred to as Task Force). Using geographic information systems (GIS) this model performs a route analysis that models the travel paths of such crash incidents from their likely point of origin – alcohol-serving facilities as determined by the Task Force (San Antonio Wrong Way Driver Task Force 2012). The WWD Model methodology is structured such that a specified Network Dataset – in this case, roadways provided by Bexar County Metro 911 – is analyzed to route WWD crash incidents from the nearest suspected facilities of origin. The customized geoprocessing toolkit then utilizes the resulting polyline dataset output to estimate the route taken by drivers based on the validated spatial relationship of reported crash incidents to reported WWD events as recorded in real-time by TransGuide Operators. A data validation of the resulting