

## ABSTRACT

The Development of a Geodatabase for Vessel Tracking.  
A Case Study of the Gulf of Paria, Trinidad.

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The safe and efficient navigation of vessels at sea is necessary to prevent accidental collisions and the loss of human life, to facilitate economic productivity and the protection of the marine environment. In light of this, certain key measures have been developed and implemented internationally to improve the management of marine traffic within ports and coastal waters. One such measure involves the use of an electronic device known as an Automatic Identification System (AIS) which uses Very High Frequency (VHF) signals to continuously transmit and receive informative information for the vessels within a particular area.

This research focused specifically on the development of a methodology involving the use of AIS receivers to collect positional and other pertinent data regarding vessels in the Gulf-of-Paria, west of the island of Trinidad. The methodology required the installation of the receivers for data-acquisition and the development of a series of Python computer programs to format and interpret the acquired data. Additionally, the channeling of the data towards the development of a GIS database was also investigated as part of the methodology developed by this research. Over the 6 months of data-acquisition, the AIS-based methodology was able to identify the presence of 947 ships, and 19131 tracks were created showing the path of transit to the various ports. The GIS database consisted of a total of six (6) tables which contained the various characteristics of the tracked vessels. The results demonstrated the viability and the practical implementation of the developed methodology, and showed the intensity of the marine traffic in the Gulf-of-Paria, thereby providing further evidence for the need of a proper vessel tracking system for this particular coastal area.

One of the primary conclusions of this research is the fact that only two (2) AIS receivers were required to provide the necessary coverage for the entire Gulf-of-Paria. This bodes well for the adoption of the methodology by other Caribbean islands that are characterized by a relatively small land mass and whose financial resources may be limited. The developed methodology represents a prototype that can be further improved or expanded through recommendations that have also been provided by this research. Additionally, the database that serves as the repository for the tracked vessel data can facilitate the development of useful GIS applications that can aid the formulation of effective management strategies.

*Key words:* Rajesh Doodlal; AIS; Receivers; Vessel Movement; Marine Traffic; Gulf of Paria; Python Programming; SQL Database; GIS.

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