

Remote Sensing and Digital Databases to Recovery Terrestrial Boundaries in West Africa – Cape Roxo Region

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SUMMARY

Guinea Bissau is located on West Africa and it is bordered by Senegal in the north and Guinea Conakry to the east and south. Its terrestrial boundary extends about 724 km from Cape Roxo, at the northwest, to Ponta Cajete, at the southeast and it consists of straight-lines segments and is demarcated by beacons. The north frontier, in Cape Roxo region is delimited by a line approximately equidistant between the river Casamance and Cacheu. For historical reasons, the Tropical Research Institute (IICT) concentrates a unique, vast and diverse amount of information concerning the Community of Portuguese-Speaking Countries boundaries. The available information includes official and diplomatic documents, correspondence, meeting proceedings of the delimitation and definition of boundaries, technical reports with detailed description of boundary demarcation and geographic coordinates of the beacons, topographic and geodesic reports, maps and sketch. This case study, located on the borderland of Cape Roxo, whose geographical location always created great interest, intends to use geographical information systems and multitemporal studies to define the exact position of some boundary beacons. The interest of the study is related with the several disputes that have been occurred mainly due to the lack of geographical information. The geographical information used, in the study, includes all available data, from oldest maps and technical reports to most recent data obtained from new geospatial technologies, such as satellite images and Global Navigation Systems (GNSS/GPS) data. Historic and geographic information, describing the Guinea Bissau boundaries, in combination with old aerial photographs (1950-1960) and recent high spatial resolution satellite images (2014), WorldView-2, are used to perform a multitemporal study. The resulted information is analysed in a Geographic Information System (GIS). To improve the spatial resolution of WorldView-2 images, several fusion procedures are applied to multispectral and panchromatic bands through the use of various available pan-sharpening algorithms to get a pan-sharpened image with higher spatial resolution. This procedure will allow enhancing the spatial information and improving terrain features interpretation. Multitemporal analysis results allowed to detect some changes in terrestrial surface, located in Cape Roxo shoreline, showing significant coastal erosion and some displaced river channel boundaries. These results will be validated by fieldwork through a collection of ground control points obtained using Global Navigation Satellite System (GNSS) technology. Also images from an Unmanned Aerial Vehicle (UAV) will be gathered to improve borderlines recognition and boundary beacons location. This approach can be extremely helpful in the interpretation of the border treaties and conventions, conducing to promising results taking advantage of geospatial technology applied to boundary issues.

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