
A Street Guide Map of Biu using a Geospatial Technique In Biu Town Borno State Nigeria

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ABSTRACT

The aim of this project is to produce a street guide map that will ease navigation within the study area. While the objectives are; digitize details of features within the study area, create and link the attribute table with the spatial data and to produce guide map of the study area. Satellite image (2023) downloaded from the Google earth pro was used to extract the road network of Biu and transferring the data to ArcMap for detailed analysis. The street names were obtained through questionnaires. 146 Roads were within three classes of Road Network Namely Major Road (5), Tarred Street (88) and Untarred Street (53). This field work revealed that some of the Road was not tarred and the new constructed ones were not documented. It shows that some of the Road was not named according to the standard and some were not named at all. From this study, I recommend that the naming system should be standardized across the study area and that recommended that provision should be made for street map revision on a yearly basis so as to account for changes.

KEYWORDS

street guide map; geographic information; AutoCAD

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INTRODUCTION

Navigating through the streets of a city efficiently and accurately has always been a challenge for residents, tourists, and commuters. Traditional paper maps have long been used as a primary means of providing guidance, but they often lack the necessary level of detail and can be difficult to interpret, especially in complex urban environments (Udah 2014). With the advancement of technology and the widespread use of digital devices, the concept of a street guide map has evolved to address these limitations and provide enhanced navigation solutions.

The development of street guide maps has been greatly influenced by the emergence of digital mapping technologies, such as Geographic Information Systems (GIS), Global Positioning System (GPS), and mobile applications (Tini 2010). These technologies have enabled the collection, analysis, and visualization of vast amounts of spatial data, allowing for the creation of highly detailed and interactive street maps. One of the key advantages of digital street guide maps is their ability to provide real-time information and dynamic updates. By incorporating live data on traffic conditions, road closures, public transportation schedules, and other relevant factors, these maps can offer users accurate and up-to-date navigation guidance. This real-time information allows individuals to make informed decisions about their routes, helping them avoid traffic congestion and delays.

In addition to real-time updates, digital street guide maps offer various features and functionalities that enhance the overall navigation experience. These maps can provide turn-by-turn directions, alternative route suggestions, and even voice-guided navigation, making it easier for users to navigate unfamiliar areas. Some applications also integrate additional information such as nearby points of interest, reviews, and ratings, allowing users to discover and explore their surroundings more effectively.

Moreover, the accessibility and widespread use of smartphones have made digital street guide maps highly convenient and user-friendly. Users can access these maps on their mobile devices anytime and anywhere, eliminating the need for

carrying and referencing bulky paper maps. The interactive nature of digital maps enables users to zoom in, pan, and customize their views, providing a more personalized navigation experience. To create accurate and comprehensive street guide maps, a significant amount of data collection and processing is required (Yusuf et al., 2021). This includes gathering information on street layouts, road networks, landmarks, addresses, and points of interest. Government agencies, transportation departments, and mapping companies often collaborate to collect and update this data. Additionally, crowd-sourced data from users, such as reporting road closures or suggesting new points of interest, plays a valuable role in keeping the maps current and reliable.

MATERIALS AND METHODS

The study area is Biu, a town located in northeastern Nigeria. Biu serves as a commercial and administrative center within the Borno State. It is characterized by a growing population, evolving road networks, and the presence of various landmarks. The town's unique urban dynamics and developmental needs make it an ideal location for the implementation of an advanced street guide map using geospatial technique. Biu Metropolis is located in Biu Local Government Area, Borno State, Nigeria. It is situated approximately 180 kilometers south-east of Maiduguri, the state capital. Biu town lies within the geographical coordinates of approximately 10°38'57.11"N and 12°08'4.75"E, 10°35'5.44"N and 12°08'2.84"E, 10°35'0.18"N and 12°13'43.6"E and 10°38'51.84"N and 12°13'47.94"E of latitude and longitude. The town is accessible via major road networks and is strategically located along the routes connecting various towns and cities in the region.

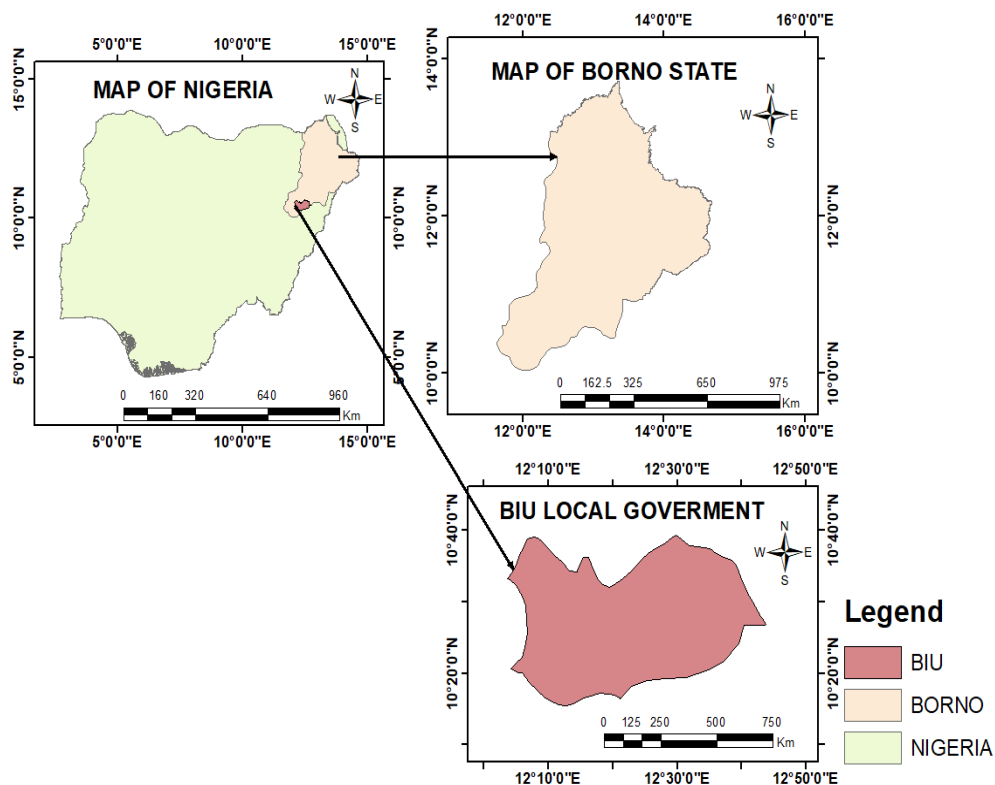


FIGURE 1: The Study Area.

Source: GIS Lab. Nigerian Army University Biu.

The geographical location of Biu Metropolis in Borno State positions it as an important centre for trade, transportation, and regional connectivity. Its location close to the Mandara Mountains and the Cameroon border adds to its significance strategic.

Data Validation and Quality Control:

Computer aided design (CAD) has extremely transformed the traditional (analogue) method of mapmaking around the globe. This project begins with acquisition of image of Biu from Google Earth pro covering Biu Town. The map was lunch to ArcMap and digitized vectored into deferent features of data class. The layers are Major roads, Tarred roads, Untarred roads, Education centers, Banks, Hospitals, Hotels, Barracks.

DISCUSSION OF RESULTS

Remote Sensing and GIS have given us the opportunity to present a map of any place of interest in the world. It can also provide opportunity for revision of any map that interests us. With the help of this, map navigation can now be easily in Biu Township which will in turn aid a lot of development in several areas such as Infrastructural Development and evenly distribution, marketing etc.

At the end of this research, a street guide map of Biu using geospatial techniques was present showing 146 roads that were captured and labelled within the study area. The roads were categorized as shown in Table 4.1. There are some streets within Biu that were not properly named or have a general name that is not good for descriptive purposes. The figures above shows the print screen of the digitization of the study area, showing classified attribute data of the major roads, tarred roads, untarred roads, banks, Educational centers, hospitals, and hotels in the study area.

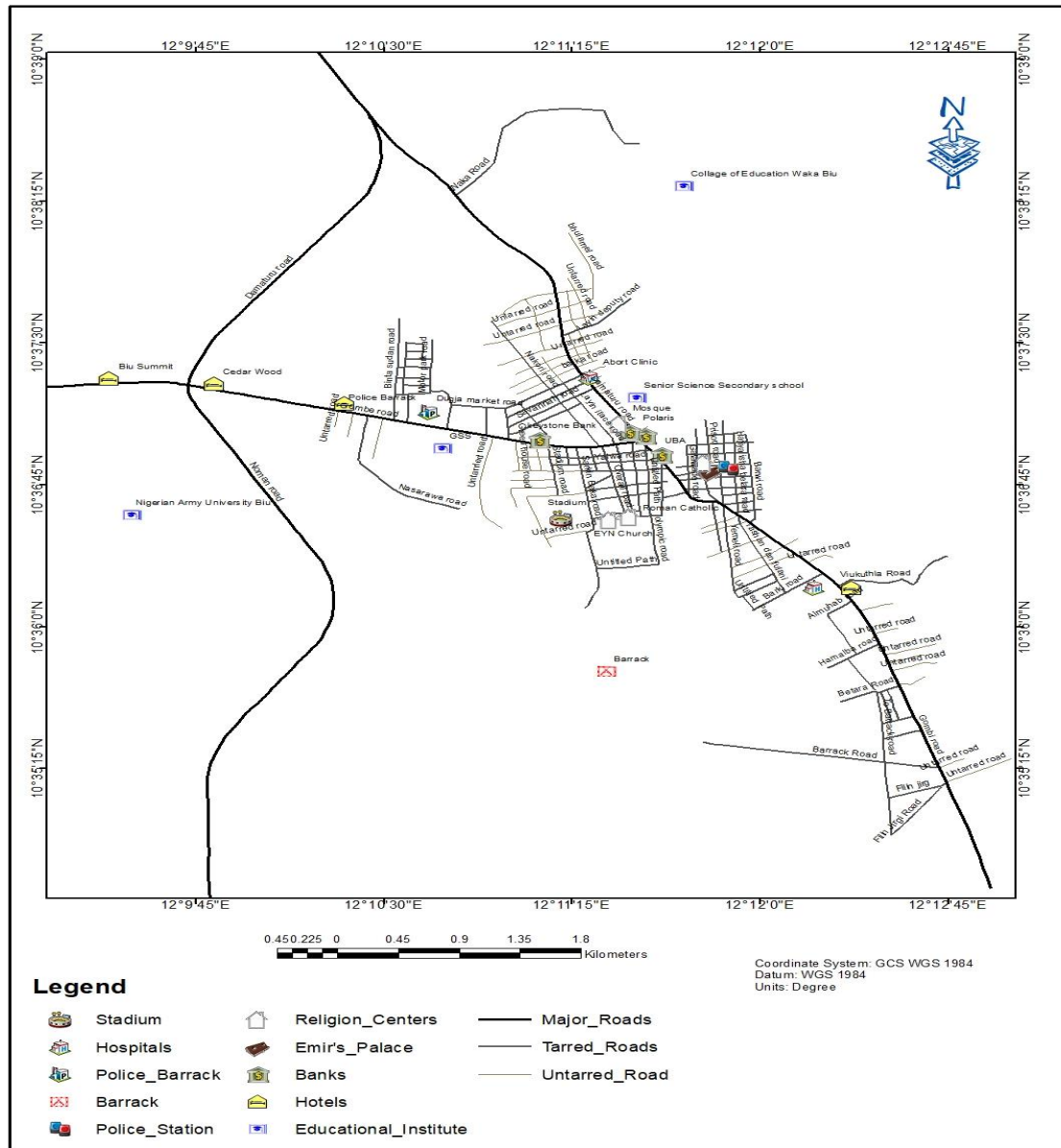


FIGURE 2: Street Guide map of Biu metropolis showing all the road networks.

Figure 2 Shows the road network within Biu town, the major road within the study area which are Gombe road, Numan Road, Gombi road and Damaturu road it also Shows the tarred road and untarred road. It shows the hotels within the study area such as Quarter house hotel, Biu Summit hotel and Cedar wood hotel along Gombe road while Umfuhad hotel along Gombi road. the figure also shows the banks in the study area such as Keystone bank along Gombe road, UBA bank along Gombi road and Access bank is around the town roundabout facing Gombe road. It also shows the hospitals like the general hospital along Gombi road, Abott hospital and hirku hospital along Damaturu road. Figure 4.8 shows the educational centers like Nigerian Army University, Government Girls Secondary School along Gombe road and the famous advanced Teacher's College waka Biu which now known as College of Education waka Biu is along Damaturu road and finally the figure shows the composite map of Biu which contain names of streets and other prominent features.

CONCLUSION

The study has achieved its objectives with full information of street guide map and shows the different between major roads, Tarred roads, untarred roads and some prominent area etc. Then, if this information is properly managed and supported with the right decision and implementation would go a long way in addressing the problem highlighted earlier in the study. Benefit of this digital composite map are noticeable in increased catchment areas for services and facilities like shops, schools, offices, banks, and leisure activities. Access to untarred roads provides relative advantages resultant upon which Commercial users located to enjoy the advantages. The results of this project are encouraging and confirm the utility of indeed satellite data like satellite imagery product in revising and updating of map of Biu. The result obtained is obviously accurate, reliable, and portrayed up-to-date information that is essential for wise and efficient decision making and such a map is useful for planning, management and urban development.

RECOMMENDATIONS

This project revealed that several roads were not properly named. Therefore, this study recommends that the local government should adopt a standard format for the entire street and implement it. Also recommend that small sign board or notice board should be used to identify the beginning and the end of each street so as to aid navigation. It's also important to create street guide map for the whole Local Government in Biu and the remaining local government at large. This project can be further revise and update when there is more development in the town.

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