# APPLICATION OF GLOBALNAVIGATION SATELLITE SYSTEM TO CADASTRAL SURVEYING:

## ACCURACY OF RTK DERIVED 100M-LONG CADASTRAL DISTANCES AND BEARINGS

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**CHAPTER ONE**

**INTRODUCTION**

**1.1 BACKGROUND TO THE STUDY**

Cadastral surveying is the discipline of land surveying that relates to the definition or re-establishment of land parcel boundaries. Cadastral surveying involves interpreting and advising on boundary locations. the status of land, and. the rights, restrictions and interests in propertyIt is also the professional process of showing or recording property boundaries, subdivision lines, buildings, and related details.

Cadastral surveying is concerned with the process of gathering evidence in the form of position information that is used to define the location of objects or land boundaries for the purposes of identifying ownership and/or the value of land parcels. This information supports a jurisdiction’s land administration,conveyance or land registration system and is critical in order to establish and maintain adigital cadastral database (DCDB).

Real-time kinematic (RTK)is a surveying technology that determines the relative positions using two Global Navigation Satellite System (GNSS)antennas in real-time with better accuracy. The errors found in GNSSRTK results are determined and corrected in realtime using technology.

RTK is mainly used for construction applications that require higher frequency like cadastral survey, drone navigation, and other construction activities.

**1.1.1.** Practical Considerations For Cadastral Surveys Using RTK GPS And The benefits Of The Technology:

i. Usefulness in finding existing survey marks.

ii. Positions can be measured in the field in real time and distances derived to compare With plan distances.

iii. Ability to brace a traverse in difficult terrain where traversing techniques would require many setups with short lines to overcome hills or heavy tree cover, potentially improving loop closure accuracy significantly by reducing the number of setups and short lines.

iv. Ability to connect to existing survey control over distances considered unfeasible using traversing techniques.

v. Ability to easily survey irregular natural boundaries.

**1.2 STATEMEMT OF PROBLEMS**

In late 2012 a guideline was released by the Surveyors Board of Queensland (SBQ)

regarding the use of RTK GNSS on Cadastral Surveys. The section in the SBQ

guideline on short distances essentially seeks to outline what distances ought to be

measured with a conventional total station, and what distances may adequately be

measured (actually calculated or derived from two points) by RTK, with due regard to

compliance with relevant cadastral surveying Regulations and surveying standards. Theassociated cautionary note in the Guideline made it clear that no definitive distance wasrecommended and this decision was essentially left to professional judgment.

However, the example using data from SP#1 (Inter-Governmental Committee onSurveying and Mapping (ICSM), 2012 - Note that this version is now superseded)indicated that given those conditions 640 meters may be appropriate, but it was alsoacknowledged that this may be shortened if improved observation techniques wereused.

Over the last few years, better performing GNSS equipments have been produced. The problem is that the distances suitable to be derived from real time kinetic (RTK) method for these new equipments have not been determined.

**1.3 AIM AND OBJECTIVES**;

**1.3.1 AIM**

The aim of this project is to determine the accuracy of RTK derived 100m-Long Cadastral distances.

This project aims to further elaborate on the distance above which distances may

adequately be derived from RTK determined distances by RTK, and below which distances ought to bemeasured with a conventional total station. The research reported in this paper to use the specified physical distances selected to represent conditions that may be encountered on acadastral survey. In this case the standard of comparison is a series of distancesmeasured with a standardized (calibrated) total station. The end points of the physicaldistances were also derived from two RTK observations taken in close succession todetermine if this may have any impact on the precision of the derived distances.

* + 1. **OBJECTIVES OF THE STUDY**

1. Pre-visitation to the site to produce a sketch of the site called RECCE Diagram.
2. To Establish four points in each leg about 100m long
3. To run GNSS RTK on the same points
4. To determine the accuracy of the RTK derived distances to the Traverse adjusted distances
5. To present the accuracy results obtained.

**1.4 STUDY AREA**

This project was carried out at an open field opposite school of humanities federal polytechnic nekede.

**1.5 SCOPE OF STUDY**

The scope of this project is to determine the accuracy of RTK derived 100m long distances by comparing it with that of calibrated Total Station.

**1.6 SIGNIFICANT OF THE STUDY**

It is expected that the result of this project work is to assist and provide the required data so as to determine if the accuracy of RTK GPS within the distance of 100m-long will be preferable in cadastral jobs.