VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama" Belagavi – 590 010

PROJECT REPORT ON

"ESTIMATION AND VISUALIZATION OF 3D ORBITS OF GPS SATELLITES USING GPS NAVIGATION DATA FILE FROM MANGALORE GNSS RECIVER"

Submitted in partial fulfillment of the requirements for the award of degree

BACHELOR OF ENGINEERING
IN
ELECTRONICS & COMMUNICATION ENGINEERING

Submitted By

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CERTIFICATE

Certified that the project work entitled "**ESTIMATION AND VISUALIZATION OF 3D ORBITS OF GPS SATELLITES USING GPS NAVIGATION DATA FILE FROM MANGALORE GNSS RECIVER**" is a bonafide work carried out by

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in partial fulfillment for the award of BACHELOR of ENGINEERING in **ELECTRONICS & COMMUNICATION ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2017–2018. It is certified that all corrections/suggestions indicated for internal assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed for the Bachelor of Engineering degree.

24/5/18	D.V.T 24/05/18	
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ABSTRACT

The main aim of the project is to estimate and visualise the 3D orbit of GPS satellite by extracting data from GPS navigation data file which is obtained from Mangalore GNSS receiver. The data extracted are compared with RINEX file and implemented in the formulas to obtain XYZ coordinates of GPS satellite and plotted in 3 Dimension by using MATLAB tool. The GPS navigation data file is extracted from GNSS receiver which contains the data of GPS satellite. These data are segregated by comparing with RINEX file and are substituted in the formulas by using MATLAB. We get XYZ coordinates of GPS satellite from formulas and a 2D plot is obtained. Then the 2D plot is interpolated by increasing the number of samples. Another 2D plot is obtained by extracting data from SP3 file which is an error free GPS data file. Both the 2D plots are compared and the variance is found which indicates the amount of error present in data of GPS navigation data file. The 2D plot which is interpolated is then converted in 3D plot with ECEF coordinates.

The path of GPS satellite in space, orbiting around the earth is estimated with earth as centre. The plot is obtained with respect to poles as well as equator. In future this work can be extended by converting 3D plot from earth centred and earth fixed coordinates to receiver centred coordinates. The GPS navigational data file is received from the GNSS receiver. The data is extracted and segregated from the navigational data file by comparing it with RINEX file. The extracted data is substituted in the formulas using the MATLAB code to obtain the XYZ coordinates. These XYZ coordinates are plotted in 2D and interpolated. The GPS data file extracted from SP3 file are also plotted in 2D and interpolated. These two interpolated signals are compared, and variance is found which indicates error present in satellite path. The interpolated signal obtained from SP3 data file is converted into 3D plot with Earth Centered Earth Fixed coordinates.