

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

“Jnana Sangama” Belagavi – 590 010



PROJECT REPORT ON

**“SITE CHARACTERIZATION AT AIET USING
MULTIPATH DATA”**

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

**BACHELOR OF ENGINEERING
IN
ELECTRONICS & COMMUNICATION ENGINEERING**

Submitted By

Name	USN
GOVINDRAO M MAHENDRAKAR	4AL14EC034
HARSHITHA S	4AL14EC040
KEERTHI VADEYAR	4AL14EC046
SHASHIKUMAR MAGADUM	4AL15EC425

**Under the Guidance of
Dr. Dattathreya**

Dean (Planning) & Senior Professor

Department of E&C Engineering



DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI – 574 225.

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ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI - 574 225

(Affiliated to VTU, BELAGAVI)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CERTIFICATE

Certified that the project work entitled "SITE CHARACTERIZATION AT AIET USING MULTIPATH DATA" is a bonafide work carried out by

GOVINDRAO M MAHENDRAKAR

4AL14EC034

HARSHITHA S

4AL14EC040

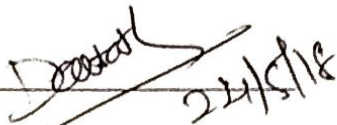
KEERTHI VADEYAR


4AL14EC046


SHASHIKUMAR MAGADUM

4AL15EC425

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.


Signature of the Guide
Dr. Dattathreya


Signature of the H.O.D
H. O. D.
Dr. D.V. Manjunatha
Dept. Of Electronics & Communication
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225

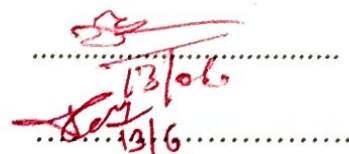

Signature of the Principal
PRINCIPAL
Dr. Peter Fernandes
Alva's Institute of Engg. & Technology,
Mijar, MOODBIDRI - 574 225, D.K.

Name of the Examiners

1. Shanley B.B
2. Ramalingam H.m

EXTERNAL VIVA

Signature with date


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ABSTRACT

Global Positioning System (GPS) signal arrives by more than one path and it is a source of positioning error which cannot be easily neutralized. The multipath environment can be understood by the direction and distance of the objects. MATLAB tool is used to read the Receiver Independent Exchange Format (RINEX) data extracted from the GPS receiver. This technique uses signal-to-noise ratio (SNR) time series and also helps in finding the portion of antenna affected by multipath error with their corresponding frequencies. Skyplot from stations with different multipath environments are plotted. The plot is in terms of elevation angles, azimuth angles and SNR data. The carrier phase multipath is directly related to SNR. Long-delay multipath signals are the signals where the reflected signal is delayed by greater than 0.1 millisecond. Some equations of elevation and azimuth angles computed through MATLAB demonstrate that the frequency content of SNR data is directly related to the multipath environment.

Multipath, to a large extent, dependent on the surrounding environment of the antenna and the satellite geometry. RINEX analysis focuses on the change of the geometry-free combination of pseudo range codes ($RP2 - RP1$) and carrier phase measurements ($\phi L1 - \phi L2$) over time. This method has been firstly tested at AIET. Various forms of results indicate the existence of multipath effect at AIET. Multipath errors also cause noise in the satellite signals, with pseudo range more affected than carrier phase. It is also worth-noted that satellite at low elevation angle is more susceptible to multipath errors than that at high elevation angle.