FLORIDA DEPARTMENT OF TRANSPORTATION

AN ELECTRONIC FIELD BOOK PROCESSING SYSTEM HANDBOOK

A Complete Reference For Use With The Electronic Field Book Data Processing System

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TRADEMARKS

Table Of Contents

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Chapter One - Introduction

The Electronic Field Book system was designed to provide the field surveyor with a vehicle to accurately and efficiently gather data for design surveys, topographic surveys, boundary surveys and other similar types of projects. The Electronic Field Book system itself consists of series of command menus and data screens that allow the operator to interact with the system.

The Electronic Field Book system command menus provide the operator access to the various command system modules, while the data screens provide the operator with an interface to actually electronically gather and save the field survey data. As each bit of field survey data is recorded by the Electronic Field Book system, it is "stamped" with the date and time of the recording. This provides a complete record that binds the field survey data together with a complete record of each field observation performed in a particular project.

If one is using EFBP in conjunction with Florida Department of Transportation's (FDOT) Electronic Field Book (EFB) survey data collection system, one is strongly urged to contact FDOT on references on use of EFB. Successful use of EFBP is enhanced when one has a strong understanding of the system which was used to collect the survey field data.

Once the field survey data has been gathered it must then be "processed", i.e. the collected field angles and distances must be reduced to create coordinates and/or elevations for all of the observed points. This act of processing includes the editing of the field survey data to remove errors and correct blunders, a vertical least squares adjustment of the field survey data, a horizontal least squares adjustment of the field survey data, the generation of coordinates for each observed point and the updating of the project database with the generated coordinates.

The Electronic Field Book Processing (EFBP) system uses a wide variety of mathematical techniques in surveying and statistics. Every user does not need to fully understand the theoretical basis for these techniques. Understanding the information which is contained in the various processing report files is more important. Most users can simply refer to this handbook for answers to most questions that deal with production issues.

There are times however when a user may want to look at some broader background descriptive information on certain algorithms in EFBP. If the user has a desire to explore these technical issues, it is suggested that they consult the Electronic Field Book Technical Reference Handbook.

The purpose of this Electronic Field Book Processing handbook is to act as a guide for the individual responsible for processing survey data and the use of the processing software system. The Electronic Field Book Processing (EFBP) system is the “engine” for the numerical processing of raw survey data (horizontal circle readings, zenith circle readings, slope distances, height of instrument, height of target, level rod readings, taping, calibrations, point names) into coordinate information. EFBP does not process attribute information (feature codes, zones, remarks/comments, chains/linework, straight vs. curve line geometry, etc.) but carries this information into an ASCII readable file format so that it can be read with the coordinate information into computer aided drafting, mapping, and design systems. The use of EFBP in this fashion is often termed as “processing” one’s data.

This handbook has been produced to assist the user with this data processing phase and the analysis of the processing results. During the course of processing, a multitude of reports are produced for the user to review. One purpose of this handbook is to provide the user with a detailed explanation of what is contained in each report and how the information may be used to analyze the validity of the field survey data. Several computer applications have been developed to aid in the processing of the data and each of these programs is also explained in this handbook.

About This Handbook

This handbook assumes that the reader has some basic land surveying background and has access to common land surveying textbooks as this handbook is not intended to eliminate the reader’s need for this type of information. This handbook also assumes that the user is familiar with PC computers and the operation of the Electronic Field Book data collection system as extensive use of the MS-DOS file naming convention is used. Both EFB and EFBP files usually consist of a project name before the period and a one (1) to three (3) character extension which alerts the user as to what type of data is contained in the file. This handbook typically makes reference to files by using only a period followed by the file extension (.CTL as an example), while it is assumed that the project name always exists before the period.

A chapter in the handbook will be devoted to a review of DOS computer basics and one will also be devoted to the Electronic Field Book data collection system. Each of these chapters is intended to act only as a reference and if the reader desires to explore either subject in greater detail, it is suggested that reader consult one of the many books written covering DOS or the Electronic Field Book User’s Guide.

While a new EFBP user will find the reading of this information, in a systematic start-to-finish fashion, beneficial, users of EFBP will most often find themselves using the table of contents and/or the index to move quickly to information that is immediately desired.

The contents of this Electronic Field Book Processing Handbook is organized as follows :

- ***Chapter One*** presents a discussion of EFBP is with specific regard to its use with the Florida Department of Transportation's Electronic Field Book (EFB) survey data collection software. The initial discussion of EFBP will make constant reference to and make example of information which is contained in a standard format in the .OBS file.

- ***Chapter Two*** discusses the basic principles of EFB including object names, EFB data records, taping, object geometry, object attributes, zones and survey chains.

- ***Chapter Three*** is a discussion of the basic concepts of least squares analysis with an emphasis being placed on the error estimation of one's measurements which includes a basic discussion of state plane coordinate systems and their impact on EFBP and other software systems.

- ***Chapter Four*** details the creation and format of the observation file which is the basis for processing raw field survey data.

- ***Chapter Five*** discusses the management of control coordinate information using a computer program referred to as CTL. This program has a wide variety of options for making control coordinate management as efficient a system as possible.

- ***Chapter Six*** discusses the processing options which are presented in menu for by EFBP. EFBP works in a non-interactive batch process once the desired options are accepted in the initial menu - i.e. you start it up and let it run to completion.

- ***Chapter Seven*** details the first of the reports generated by EFBP. This chapter covers the raw data abstracting report or the .GEN file.