UNAVCO Academic Research Infrastructure (ARI) GPS Receiver and Antenna Test Report (1995)

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UNAVCO Academic Research Infrastructure (ARI) Receiver and Antenna Test Report

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Introduction

The UNAVCO GPS research community has been funded under National Science Foundations's Academic Research Infrastructure (ARI) program to purchase GPS equipment for scientific applications. There is a large variety of commercial GPS receivers available and the UNAVCO facility tested several of these instruments to aid ARI participants in selecting the appropriate receiver for their research. The tested equipment had to satisfy several minimal requirements: (1) Full wavelength L1 and l2 carrier phase has to be tracked under A/S and non-A/S conditions, and (2) Pseudorange data are required at both GPS frequencies. The manufacturers and instruments which fulfilled the requirements and participated in these tests are given in Table 1 and include Allen Osborne Associates, Inc., Ashtech, Leica, Inc. and Trimble Navigation, Ltd. Antennas tested are given in Table 2 and Table 3 and general receiver specifications are listed in Table 4. These tests are in many ways different from earlier tests conducted by the UNAVCO facility. The purpose of earlier tests was to find the receiver which was best suited for UNAVCO supported geodetic research. This "best" receiver was then recommended to the UNAVCO Steering Committee for purchase. The tests presented here do not intend to identify the best receiver. Different aspects may be of different importance to various investigators in the UNAVCO community. Some investigators may consider download speed or compatibility with other equipment more important than zero baseline or real time kinematic performance. Receiver costs obviously will play a major role in equipment selection.

In order to ensure optimal receiver performance using the most recent equipment and software, the vendors were invited to participate in any or all aspects of the these tests. Vendors have also reviewed drafts of this report and were invited to submit their comments, contained in Appendix E.

Tests conducted were intended to provide a wide range of information to be used by the individual investigators for selecting the appropriate receiver according to their own priorities and needs. Data for short, zero, and mixed antenna baselines were processed using the Bernese GPS software with typical processing parameters such as indicated in the ARI Vendor Ordering Agreements Exhibit A. Unless noted, the epoch interval was 30 seconds with 15 degree elevation cutoff. These tests were designed to show optimal receiver performance. Not all receiver data could, however, be processed with the same degree of automation. In particular, the AOA Turborogue and Rascal data at times required extra manual data editing and/or special tuning of default processing parameters. These problems typically, but not exclusively, occurred between 15 and 20 degrees. AOA recommends using a 20 degree cutoff when A/S

is activated on the satellites. Problems encountered may differ with other processing packages.

[See attached .pdf file for more.]

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