UNAVCO 2003 GPS Receiver and Antenna Testing in Support of the Plate Boundary Observatory (PBO)

15 Victoria Andreatta July 16, 2009 GNSS Receiver Test Reports 5213

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The attached file contains the 2003 PBO Permanent Station Receiver Test Report.

The UNAVCO Facility in Boulder was tasked with evaluating various GPS receivers submitted by manufacturers in response to the PBO Permanent Station Request for Proposal, as well as providing technical recommendations to the PBO Principal Investigators. This document represents the test results upon which the technical recommendation were based. Manufacturers who responded to the bid specification, and who were chosen for evaluations, provided the systems listed in Table 1.1. It should be noted that these receivers mark a significant improvement in GPS technology having direct Internet connectivity (no local computer is needed), low power consumption (<5watts), UNAVCO's standard data format (BINEX), compact size, and superior tracking performance.

Table 1.1 – Receiver and antenna pairs tested

Topcon Odyssey RS	TPS CR4 DM Choke
Topcon Odyssey RS	TPS PG-A1 Geod
Topcon Odyssey RS	TPS CR3 Choke
Trimble NetRS	TRM 41249 Zephyr Geod
Trimble NetRSN	TRM 49700 Choke
Trimble NetRSN	TRM 29659 DM Choke

Each receiver/antenna pair was tested and scored independently. The technical tests can be summarized in three main categories:

(1) Receiver Tracking and Data Quality Tests. These tests are based on statistics determined from UNAVCO's Translation, Editing, and Quality Checking program (TEQC), and contain information that can be determined from a single GPS file (one receiver/antenna). Included are tracking percentages, cycle slip counts, and multipath statistics.

(2) Baseline processing tests. For this part of the evaluation, both zero and short baseline processing was performed using the Bernese 4.2 processing software. These results resemble actual geodetic processing results. However, on very short baselines most propagation effects are canceled, putting the emphasis on receiver/antenna performance.

(3) Receiver power tests and on-board memory configuration.

These test results are summarized in each section and were used to generate a numerical ranking of relative receiver/antenna technical performance. The results will be included in a separate and

confidential response to the PBO Principal Investigators. In addition, a series of mandatory PBO requirements were tabulated and are presented throughout this report. The appendix contains a section on receiver interfacing and configuration, photographs, and the antenna phase center patterns used.