PROJECT REPORT

LAKE ONTARIO, NEW YORK *LIDAR* CONTROL (DETROIT CORPS OF ENGINEERS)

AUGUST 2001

I. INTRODUCTION

A. Purpose: This project was performed for EarthData International of Maryland to establish horizontal and vertical positions of control points to use in conjunction with light detection and ranging or LIDAR aerial mapping. The main objective of this project was to provide a vertical component in order to generate two-foot contour intervals to National Map Accuracy Standards. Previously established National Geodetic Survey (N.G.S.) monuments were used as reference points at selected locations throughout the Lake Ontario coastline area to ensure that World Geodetic System of 1984 values were available on all located control points. Mr. Ralph Bunting provided three overall maps showing the locations of the required points and an ASCII text file of approximate latitudes and longitudes of said points. The final deliverable of horizontal position is to be latitudes and longitudes referencing the WGS84 system reported in decimal degrees and the vertical position referencing the NAVD88 datum in meters.

B. Points of Contact:

GPS Consultant

James E. Kovas, PE, PS
Wade-Trim Inc.
601 N. Saginaw Street
Flint, Michigan 48502
Phone: 810-235-2555

Owner

Ralph Bunting
Senior Estimator, Project Manager
EarthData International of Maryland
45 W. Watkins Mill Road
Gaithersburg, MD 20878
Phone: (301) 948-8550

C. Project Personnel:

Brett Dodge, SIT – Project Manager & GPS Tech.	WADE-TRIM
John Supina – GPS Tech.	WADE-TRIM

II. SURVEY METHODS

A. Equipment: Wade-Trim survey crews used six (6) Trimble dual frequency (L1/L2) GPS receivers consisting of four model 4000's, a single model 4700, and a single model 4800 to complete this project. Fixed height tripods (set at 1.8 meters plus antenna height) were used to minimize centering errors and height discrepancies.

B. Network Design: The National Geodetic Survey monuments used in this network are on the North American Vertical Datum of 1988 and include the following:

PID#	DESIGNATION	COUNTY
AB3848	WOLCOTT	WAYNE
AB3856	ELLISBURG	JEFFERSON
AE2165	BROCPORT	MONROE
OF0033	Z 190	JEFFERSON
OF0614	CON	WAYNE
OF1042	L 129	MONROE
OG0003	D 21	ORLEANS
OG0490	MEDINA	ORLEANS

C. Comments: Each new control point was occupied a minimum of sixty (60) minutes with as few obstructions as possible at each location. The master station NGS monuments were occupied anywhere from 4-12 hours based on network geometry.

D. Data Processing: All baselines were loaded into Trimble Geomatics Office v1.50 and used the GEOID 99 model for analysis. The final adjustment resulted in a network reference factor of 1.00 and passing of the Chi Square Test. Standard error values for each new point were about 1 centimeter for the X and Y coordinates, while the standard error values were in the neighborhood of 18 centimeters, on average, for the vertical. The reason for this higher standard error value is due to the nature of and vast area the survey included. Some of the longer baselines (approaching 50 miles) did not allow for many redundancies and the adjustment was less confident statistically as can been seen in shorter baseline applications of GPS. However, the accuracy of all the points is extremely good based

on the long observation times used. These values are well within the tolerances necessary to generate a two-foot contour interval map.

III. CONCLUSION

One simultaneous adjustment was performed on the entire data set to ensure that all coordinates and adjustments were unique to one network. Upon completion of this project, it shall be submitted to Mr. Ralph Bunting of Earthdata International of Maryland for his/their use and/or distribution.