

# *3-D COGO Example Data - HARN Connected GPS Control Points at Oregon's Institute of Technology*

Data Collected by: NGS and various vendors during on campus demonstrations

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Tabulated and Earl F. Burkholder - October, 1996

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<u>Station</u>	<u>Geocentric Coordinates</u>	<u>Geodetic Coordinates</u>	<u>Assumed Standard Deviations</u>	
			<u>Example 1</u>	<u>Example 2</u>
K-785	X= -2,490,977.048	$\phi$ = 42 15 16.99294N	0.005 N/S	0.10 N/S
	Y= -4,019,738.188	$\lambda$ =121 47 09.35422W	0.005 E/W	0.10 E/W
	Z= 4,267,460.384	h= 1,297.866M	0.005 UP	0.005 UP
Trimble	X= -2,490,854.501	$\phi$ = 42 15 22.59644N	0.005 N/S	0.10 N/S
	Y= -4,019,681.242	$\lambda$ =121 47 06.11898W	0.005 E/W	0.10 E/W
	Z= 4,267,591.406	h= 1,302.365M	0.10 UP	0.005 UP
Median-2	X= -2,491,313.163	$\phi$ = 42 15 15.61009N	0.100 N/S	1.00 N/S
	Y= -4,019,556.682	$\lambda$ =121 47 25.98592W	0.100 E/W	1.00 E/W
	Z= 4,267,423.420	h= 1,289.871M	0.100 UP	0.005 UP
Pub	X= -2,490,534.863	$\phi$ = 42 15 32.91354N	0.005 N/S	1.00 N/S
	Y= -4,019,658.196	$\lambda$ =121 46 54.79688W	0.005 E/W	1.00 E/W
	Z= 4,267,850.838	h= 1,337.720M	0.100 UP	1.00 UP

## Traverse Values:

K-785 to Trimble:  
 $\Delta X = 122.5471 \quad +/\text{-} 0.006$   
 $\Delta Y = 56.9460 \quad +/\text{-} 0.004$   
 $\Delta Z = 131.0224 \quad +/\text{-} 0.005$

Trimble to Pub:  
 $\Delta E = 259.5629 \quad +/\text{-} 0.004$   
 $\Delta N = 318.4064 \quad +/\text{-} 0.006$   
 $\Delta U = 35.3414 \quad +/\text{-} 0.008$

K-785 to Median-2:  
 $SD = 383.776 \quad +/\text{-} 0.005$   
 $VA = -1^\circ 11' 44'' \quad +/\text{-} 10''$   
 $Azi = 263^\circ 36' 56'' \quad +/\text{-} 5''$

Median-2 to Pub-2:  
 $SD = 893.7231 \quad +/\text{-} 0.005$   
 $Zen = 86^\circ 56' 06'' \quad +/\text{-} 10''$   
 $Azi = 53^\circ 14' 38'' \quad +/\text{-} 5''$

## Notes:

- Stations K-785 and Median-2 were connected to the Oregon and California HARN's by NGS in August, 1992. For more details see GPS example in Appendix C-8, Elementary Surveying, 9th, by Wolf & Brinker.
- Data for stations Trimble & Pub were collected by various vendors during on-campus demonstrations of GPS equipment.
- The campus network was adjusted locally and listed values differ slightly from the final values published by NGS for K-785 and Median-2.
- The 4 stations listed above are used as examples for performing 3-D coordinate geometry computations using BURKORD™. The "traverse" values shown were computed from the listed station values.
- The standard deviations listed above were assumed solely for the purpose of illustrating the computational features of BURKORD™ Version 8A. They are not legitimate statements of the quality of those positions.
- Different station numbers were used for the same point in the examples to reflect different assumptions made for the standard deviations of the published coordinates and for assumptions made for traverse computations.