

October 31, 2012

Control Survey Report  
For  
Supplemental Ground Control & Ground  
Control Quality Check Point Surveys

American Samoa Ortho  
USGS Contract: G10PC00026  
USGS Task Order: G12PD00480  
Photo Science Project No. 7505-068



1400 Independence Road  
Rolla, Missouri 65401

Presented by



523 Wellington Way, Suite 375  
Lexington, KY 40503  
859-277-8700

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For  
Supplemental Ground Control & Ground  
Control Quality Check Point Surveys  
American Samoa Ortho  
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- I. Survey Report Summary
- II. Final Coordinate Listing
- III. Scale & Convergence Summary
- IV. Network Summary
- V. Point Photos
- VI. NGS Data Sheets
- VII. POB Mapping Services Reports



# I. Survey Report Summary

Control Survey Report  
For  
Supplemental Ground Control & Ground  
Control Quality Check Point Surveys

American Samoa Ortho  
USGS Contract: G10PC00026  
USGS Task Order: G12PD00480



1400 Independence Road  
Rolla, Missouri 65401  
Photo Science Project No. 7505-068

Photo Science, Inc. was contracted by US Geological Survey to provide survey control points to be utilized in the production of orthos for the American Samoa project. In addition, 25 ortho check points were withheld from the control solution and used as check points for validating accuracies of the orthos.

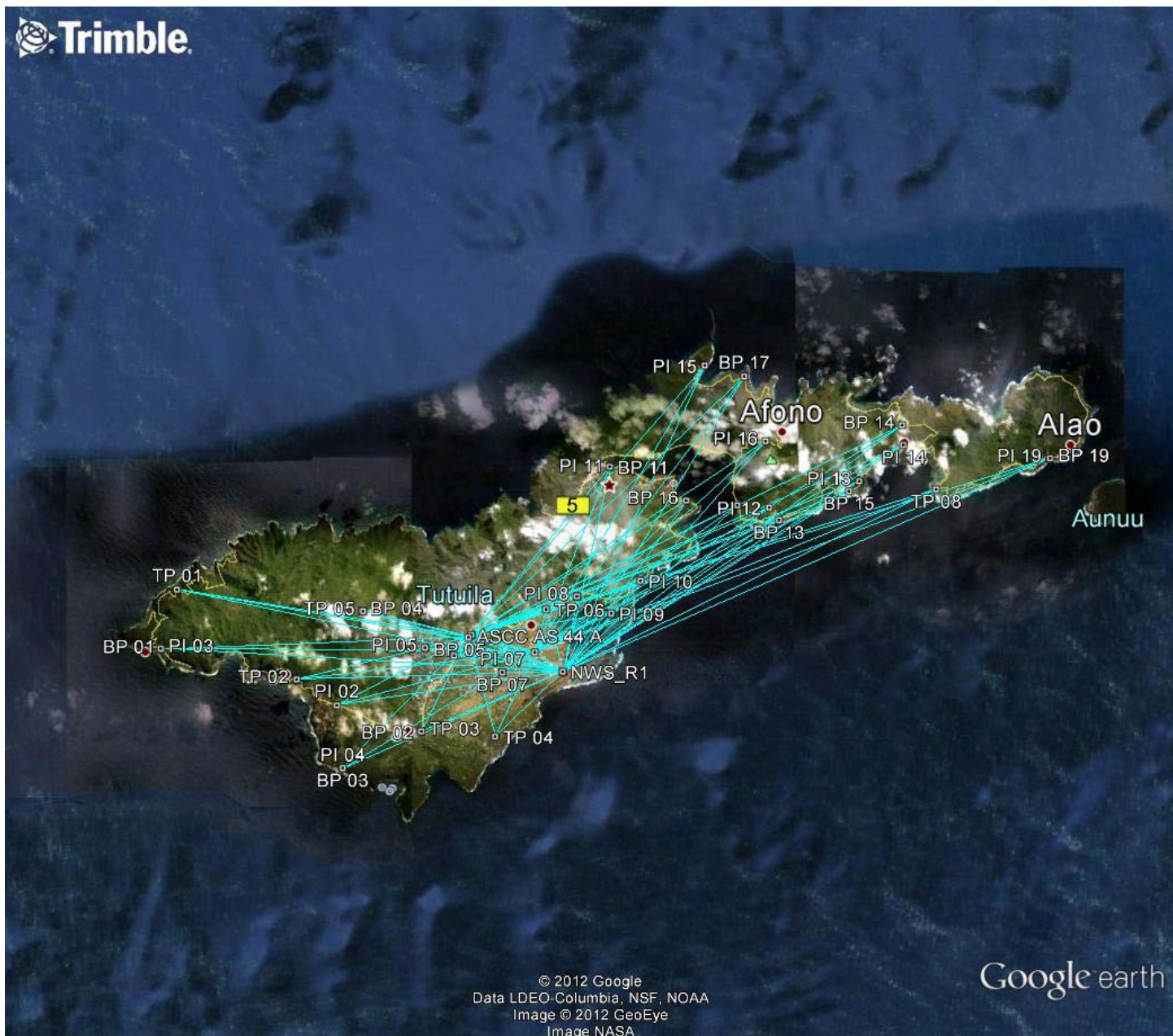
Two Photo Science GPS technicians were mobilized to the site in Late – June 2012, with dual-frequency Trimble 5700 and R7 GNSS units to establish horizontal and vertical control for the Tutuila Island portion of project. GPS static acquisition sessions lasting a minimum of twenty-five minutes were conducted on each of the control/check points. All GPS data was processed for horizontal and vertical solutions using Trimble Business Center Version 2.70 software. A data log sheet was filled out for each occupation and a photograph was taken of each point.

The basis for horizontal control are **American Samoa CORS ARP (ASPA)**, a NGS CORS station and two “A” order, NGS HARN control points, **Satellite Triang Station 022** and **ASCC**

**AS 44 A** located on Tutuila Island. Basis of vertical control are First Order, Class II NGS Bench Mark monuments **Satellite Triang Station 022** and **ASCC AS 44 A**.

Photo Science also partnered with POB Mapping Services, a locale surveying company located at NU'UULI, PAGO PAGO American Samoa 96799. POB provided control for the Outer Islands of Ofu, Olosega and Tau in addition to additional control on Tutuila Island. Survey reports from POB are located in the appendix of this report.

No major problems were encountered in the field. The photograph for each point can be found in this report. The Horizontal coordinates are Universal Transverse Mercator (UTM) S Zone 2 coordinate system in meters North American Datum of 1983 (PACP00 Epoch 2002.0) (Seven Parameter). Vertical Datum ASVD 02 was utilized for all surveyed control points on the Island of Tutuila and Vertical Datum LMSL was utilized for the Outer Islands of Ofu, Olosega and Tau.



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Image © 2012 GeoEye  
Image NASA

Google earth

Google earth



# GPS Project Summary

<b>Project</b>	AMSAM\7505-068
<b>Location</b>	American Samoa Tutuila Island
<b>Photo Science Project Number</b>	7505-068
<b>Date</b>	10/31/2012
<b>Person Responsible for GPS Calculations</b>	Grover Bivens
Coordinate Projection	UTM 2South Zone
Applicable Datum	NAD 83 (PACP00)
Units (USF, Feet, Meters)	Meters
Geoid Model Employed	GEOID09
GPS Hardware Used	Trimble 5700 and R7GNSS
Single or Dual Frequency	Dual
Crew Size for GPS Operations	2 - person
Observation Methodology	Static and Rapid Static RTK
Maximum Baseline Length	19,043.5 Meters
GPS Software Employed	Trimble Business Center V2.70
Ephemerides - Broadcast or Precise	Precise
Number of Network Points (Known & Unknown)	46
Number of Known Horizontal Points Held in Final Soln	3
Number of Known Vertical Points Held in Final Soln	2
Number of Independent Baselines	105
Ratio -- Independent Baselines to Network Points	2.28
<b>Horizontal Control Points Employed</b>	<b>Accuracy of Control</b>
ASPA	CORS STATION
ASCC AS 44A	Order 0
SATELLITE TRIANG STATION 022	Order 0
<b>Vertical Control Points Employed</b>	
ASCC AS 44A	First Order Class II
SATELLITE TRIANG STATION 022	First Order Class II

## II. Final Coordinate Summary

Photo Science Inc.  
 523 Wellington Way  
 Suite 375  
 Lexington, Kentucky 40503  
 USA

Phone: 859-277-8700  
 Fax: 859-277-8901  
 www.photoscience.com

Project information		Coordinate System	
Name:	C:\TBC\7505-068_AMSAM\7505-068.vce	Name:	UTM
Size:	2 MB	Datum:	NAD 1983 (PACP00 Epoch 2002.0)
Modified:	10/23/2012 8:25:38 AM (UTC:-4)	Zone:	2 South (171W)
Time zone:	Eastern Standard Time	Geoid:	GEOID09 (AS)
Reference number:	7505-068	Vertical datum:	ASVD 02
Description:	American Samoa		

### Point List

ID	Easting (Meter)	Northing (Meter)	Elevation (Meter)	Feature Code
AS 44A	527867.780	8416665.024	45.249	
ASPA	529934.701	8416189.447	19.853	AJ5871
BP 01	518261.580	8416285.870	4.037	
BP 02	526389.464	8413732.735	91.139	
BP 03	523912.397	8412588.136	5.664	
BP 04	524619.307	8417510.222	400.182	
BP 05	526532.791	8416324.691	153.368	
BP 06	527951.435	8416737.742	44.263	
BP 07	528921.725	8415567.133	21.321	
BP 08	531268.328	8417915.313	5.372	
BP 09	532320.453	8417363.263	2.487	
BP 11	532285.703	8421966.917	1.597	
BP 12	536277.095	8420756.650	2.481	
BP 13	537580.264	8420293.639	6.165	
BP 14	541397.230	8423230.265	180.221	
BP 15	539769.211	8421192.719	2.944	
BP 16	534679.426	8420910.158	2.770	
BP 17	536496.175	8424764.391	93.399	
BP 19	546085.494	8422212.250	2.289	
NWS	530818.516	8415561.660	3.823	AA3709
NWS_R1	530808.909	8415580.874	3.919	
PI 01	527419.910	8416094.287	68.272	
PI 02	523739.430	8414544.913	32.320	

PI 03	518220.328	8416314.713	3.713	
PI 04	523910.050	8412557.202	4.787	
PI 05	526521.752	8416355.979	154.661	
PI 06	527967.141	8416727.465	44.044	
PI 07	528926.508	8415546.013	20.955	
PI 08	531255.270	8417925.382	6.132	
PI 09	532328.896	8417391.923	2.553	
PI 10	533244.258	8418410.246	3.931	
PI 11	532317.939	8421964.693	1.706	
PI 12	537278.167	8420685.077	5.684	
PI 13	540101.028	8421501.103	2.554	
PI 14	541482.724	8422629.686	3.087	
PI 15	535271.225	8425119.565	2.754	
PI 16	537144.521	8422742.051	254.190	
PI 19	546063.486	8422206.243	2.589	
TP 01	518736.459	8418151.413	47.412	
TP 02	522475.915	8415347.909	4.076	
TP 03	526379.000	8413729.945	91.294	
TP 04	528688.126	8413563.344	18.617	
TP 05	524647.998	8417506.472	401.317	
TP 06	530292.817	8417525.558	8.946	
TP 07	534713.952	8420899.732	2.904	
TP 08	542510.426	8421248.330	32.694	

10/31/2012 10:05:25 AM	C:\TBC\7505-068_AMSAM\7505-068.vce	Trimble Business Center
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7505-068 American Samoa

NAD83(PACP00 Epoch 2002.0) UTM S Zone 2 ASVD 02Geoid 09 (American Samoa)

Blind Check points

OFU Check

Id	Given X	Given Y	Given Z
GCP4	642651.521	8432881.448	2.710
GCP20	648580.272	8433529.134	4.453
GCP12	648213.990	8432677.482	4.447
GCP2	642353.439	8433776.673	1.170
GCP13	648364.040	8432400.896	3.859
GCP10	647543.804	8433214.787	4.276
GCP7	643827.398	8431434.633	3.539

TAU check

Id	Given X	Given Y	Given Z
GCP34	669867.592	8427891.121	32.016
GCP28	660359.453	8426019.102	34.723
GCP21	660453.206	8427312.384	3.362
GCP40	669749.874	8428127.682	31.824
GCP37	670451.778	8427467.762	31.833

Tutuila

Id	Given X	Given Y	Given Z
PI-14	541482.724	8422629.686	3.087
PI-08	531255.270	8417925.382	6.132
PI-02	523739.430	8414544.913	32.320
PI-01	527419.910	8416094.287	68.272
GCP-9	532035.451	8416009.295	2.103
GCP-5	530777.128	8415172.423	3.790
GCP-2	529536.041	8414713.429	8.455
GCP-15	531002.680	8415769.486	2.225
GCP-12	531782.984	8416125.547	1.705
ALAO_GCP	547029.906	8423056.279	3.598
GCP-11	532222.408	8416199.787	1.397
GCP-16	531091.253	8415973.749	2.199
GCP-3	529951.712	8414920.666	7.687

# III. Scale & Convergence Summary

## 7505-068 American Samoa

NAD83(PACP00 Epoch 2002.0) UTM S Zone 2 ASVD 02Geoid 09 (American Samoa)

Point ID	Northing	Easting	Elevation	Elli Hgt	Latitude	Longitude	Projection SF	Height SF	Comb SF	Conv Ang
AS 44A	8416665.024	527867.780	45.249	78.692	-14°19'18.58306"	-170°44'29.68821"	0.99960961	0.99998766	0.99959728	-0°03'50"
ASPA	8416189.447	529934.701	19.853	53.268	-14°19'33.98521"	-170°43'20.66960"	0.99961108	0.99999165	0.99960274	-0°04'07"
BP 01	8416285.870	518261.580	4.037	37.185	-14°19'31.21332"	-170°49'50.36205"	0.99960412	0.99999417	0.99959830	-0°02'31"
BP 02	8413732.735	526389.464	91.139	124.453	-14°20'54.08128"	-170°45'18.93506"	0.99960861	0.99998049	0.99958911	-0°03'38"
BP 03	8412588.136	523912.397	5.664	38.870	-14°21'31.41929"	-170°46'41.59976"	0.99960707	0.99999391	0.99960098	-0°03'18"
BP 04	8417510.222	524619.307	400.182	433.534	-14°18'51.18290"	-170°46'18.15933"	0.99960750	0.99993205	0.99953957	-0°03'23"
BP 05	8416324.691	526532.791	153.368	186.790	-14°19'29.70820"	-170°45'14.24187"	0.99960871	0.99997072	0.99957944	-0°03'39"
BP 06	8416737.742	527951.435	44.263	77.707	-14°19'16.21305"	-170°44'26.89827"	0.99960966	0.99998782	0.99959749	-0°03'51"
BP 07	8415567.133	528921.725	21.321	54.717	-14°19'54.28034"	-170°43'54.46213"	0.99961035	0.99999142	0.99960177	-0°03'59"
BP 08	8417915.313	531268.328	5.372	38.797	-14°18'37.75522"	-170°42'36.22070"	0.99961209	0.99999392	0.99960601	-0°04'18"
BP 09	8417363.263	532320.453	2.487	35.879	-14°18'55.68085"	-170°42'01.07586"	0.99961292	0.99999438	0.99960730	-0°04'27"
BP 11	8421966.917	532285.703	1.597	34.995	-14°16'25.83362"	-170°42'02.43410"	0.99961289	0.99999451	0.99960741	-0°04'26"
BP 12	8420756.650	536277.095	2.481	35.926	-14°17'05.04996"	-170°39'49.16068"	0.99961628	0.99999437	0.99961065	-0°04'59"
BP 13	8420293.639	537580.264	6.165	39.561	-14°17'20.05834"	-170°39'05.64148"	0.99961747	0.99999380	0.99961127	-0°05'10"
BP 14	8423230.265	541397.230	180.221	213.472	-14°15'44.27604"	-170°36'58.40218"	0.99962120	0.99996654	0.99958775	-0°05'40"
BP 15	8421192.719	539769.211	2.944	36.266	-14°16'50.68347"	-170°37'52.62727"	0.99961956	0.99999432	0.99961388	-0°05'27"
BP 16	8420910.158	534679.426	2.770	36.253	-14°17'00.12694"	-170°40'42.49336"	0.99961488	0.99999432	0.99960919	-0°04'46"
BP 17	8424764.391	536496.175	93.399	126.612	-14°14'54.58802"	-170°39'42.04307"	0.99961647	0.99998015	0.99959664	-0°05'00"
BP 19	8422212.250	546085.494	2.289	35.337	-14°16'17.14591"	-170°34'21.87581"	0.99962627	0.99999446	0.99962073	-0°06'19"
NWS	8415561.660	530818.516	3.823	37.198	-14°19'54.38461"	-170°42'51.13897"	0.99961175	0.99999417	0.99960592	-0°04'15"
NWS_R1	8415580.874	530808.909	3.919	37.295	-14°19'53.75957"	-170°42'51.46050"	0.99961174	0.99999415	0.99960590	-0°04'15"
PI 01	8416094.287	527419.910	68.272	101.693	-14°19'37.17667"	-170°44'44.61845"	0.99960930	0.99998406	0.99959337	-0°03'47"
PI 02	8414544.913	523739.430	32.320	65.593	-14°20'27.73159"	-170°46'47.43707"	0.99960697	0.99998972	0.99959669	-0°03'16"
PI 03	8416314.713	518220.328	3.713	36.860	-14°19'30.27546"	-170°49'51.73990"	0.99960411	0.99999422	0.99959833	-0°02'30"
PI 04	8412557.202	523910.050	4.787	37.991	-14°21'32.42628"	-170°46'41.67714"	0.99960707	0.99999404	0.99960112	-0°03'18"
PI 05	8416355.979	526521.752	154.661	188.083	-14°19'28.69017"	-170°45'14.61149"	0.99960870	0.99997052	0.99957923	-0°03'39"
PI 06	8416727.465	527967.141	44.044	77.488	-14°19'16.54699"	-170°44'26.37360"	0.99960967	0.99998785	0.99959753	-0°03'51"
PI 07	8415546.013	528926.508	20.955	54.350	-14°19'54.96762"	-170°43'54.30161"	0.99961035	0.99999148	0.99960183	-0°03'59"
PI 08	8417925.382	531255.270	6.132	39.558	-14°18'37.42802"	-170°42'36.65702"	0.99961208	0.99999380	0.99960588	-0°04'18"
PI 09	8417391.923	532328.896	2.553	35.946	-14°18'54.74760"	-170°42'00.79524"	0.99961293	0.99999437	0.99960729	-0°04'27"
PI 10	8418410.246	533244.258	3.931	37.371	-14°18'21.56221"	-170°41'30.28410"	0.99961367	0.99999414	0.99960781	-0°04'34"
PI 11	8421964.693	532317.939	1.706	35.105	-14°16'25.90466"	-170°42'01.35811"	0.99961292	0.99999450	0.99960742	-0°04'26"

## 7505-068 American Samoa

NAD83(PACP00 Epoch 2002.0) UTM S Zone 2 ASVD 02Geoid 09 (American Samoa)

Point ID	Northing	Easting	Elevation	Elli Hgt	Latitude	Longitude	Projection SF	Height SF	Comb SF	Conv Ang
PI 12	8420685.077	537278.167	5.684	39.094	-14°17'07.33179"	-170°39'15.74423"	0.99961719	0.99999387	0.99961106	-0°05'07"
PI 13	8421501.103	540101.028	2.554	35.867	-14°16'40.62843"	-170°37'41.56889"	0.99961989	0.99999438	0.99961427	-0°05'30"
PI 14	8422629.686	541482.724	3.087	36.353	-14°16'03.82016"	-170°36'55.51579"	0.99962128	0.99999430	0.99961559	-0°05'41"
PI 15	8425119.565	535271.225	2.754	35.920	-14°14'43.08410"	-170°40'22.93849"	0.99961539	0.99999437	0.99960976	-0°04'50"
PI 16	8422742.051	537144.521	254.190	287.547	-14°16'00.38407"	-170°39'20.30671"	0.99961707	0.99995493	0.99957201	-0°05'06"
PI 19	8422206.243	546063.486	2.589	35.638	-14°16'17.34277"	-170°34'22.60995"	0.99962624	0.99999441	0.99962066	-0°06'19"
TP 01	8418151.413	518736.459	47.412	80.522	-14°18'30.47809"	-170°49'34.55560"	0.99960434	0.99998738	0.99959173	-0°02'35"
TP 02	8415347.909	522475.915	4.076	37.338	-14°20'01.63212"	-170°47'29.64464"	0.99960625	0.99999415	0.99960040	-0°03'06"
TP 03	8413729.945	526379.000	91.294	124.608	-14°20'54.17244"	-170°45'19.28431"	0.99960861	0.99998047	0.99958908	-0°03'38"
TP 04	8413563.344	528688.126	18.617	51.906	-14°20'59.51229"	-170°44'02.18369"	0.99961018	0.99999186	0.99960205	-0°03'57"
TP 05	8417506.472	524647.998	401.317	434.671	-14°18'51.30403"	-170°46'17.20144"	0.99960751	0.99993187	0.99953941	-0°03'23"
TP 06	8417525.558	530292.817	8.946	42.377	-14°18'50.48082"	-170°43'08.76854"	0.99961135	0.99999336	0.99960471	-0°04'10"
TP 07	8420899.732	534713.952	2.904	36.386	-14°17'00.46478"	-170°40'41.34053"	0.99961490	0.99999430	0.99960920	-0°04'46"
TP 08	8421248.330	542510.426	32.694	65.940	-14°16'48.72682"	-170°36'21.13867"	0.99962235	0.99998966	0.99961202	-0°05'50"

# IV. Network Summary

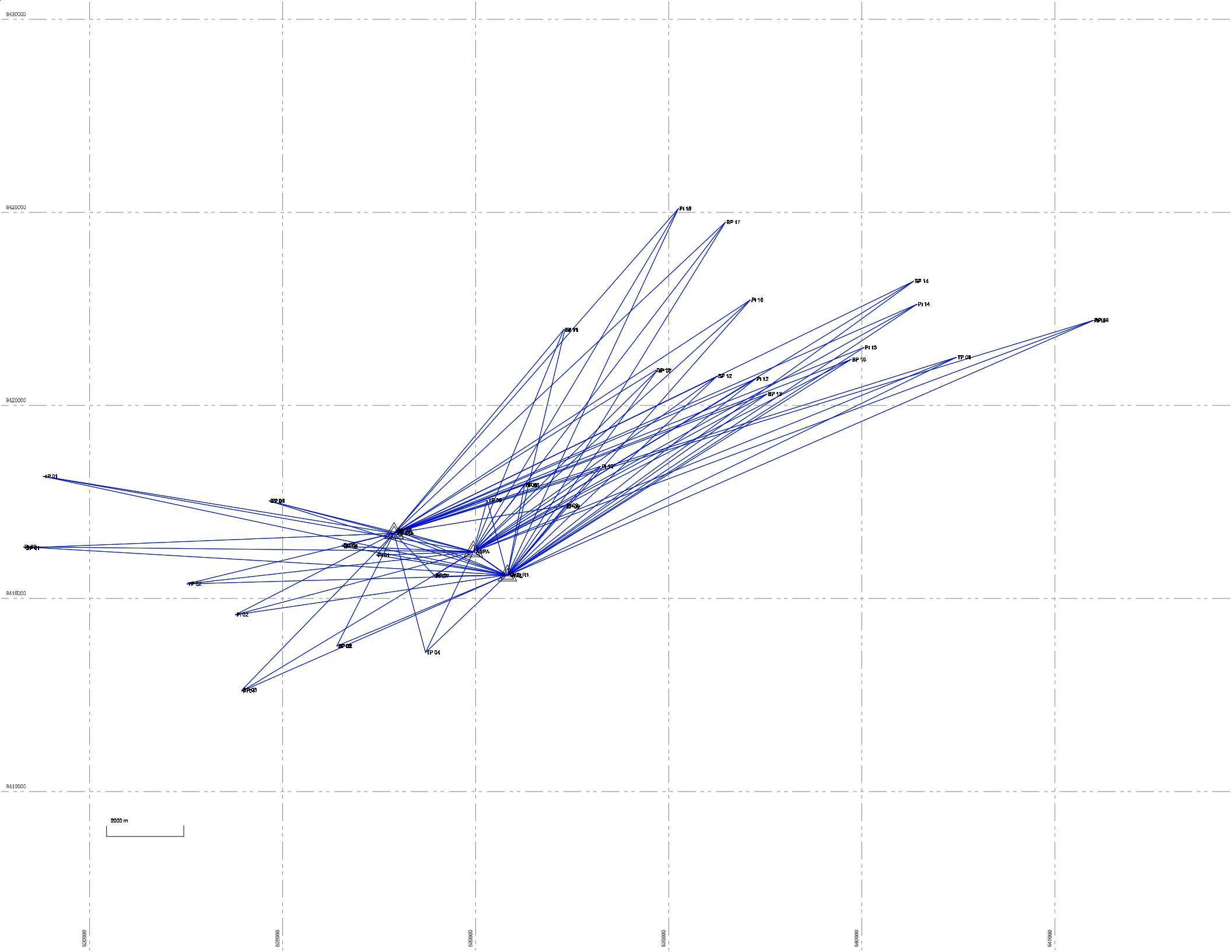


Photo Science Inc.  
 523 Wellington Way  
 Suite 375  
 Lexington, Kentucky 40503  
 USA

Phone: 859-277-8700  
 Fax: 859-277-8901  
 www.photoscience.com

Project information		Coordinate System	
Name:	C:\TBC\7505-068_AMSAM\7505-068.vce	Name:	UTM
Size:	2 MB	Datum:	NAD 1983 (PACP00 Epoch 2002.0)
Modified:	10/31/2012 10:51:51 AM (UTC:-4)	Zone:	2 South (171W)
Time zone:	Eastern Standard Time	Geoid:	GEOID09 (AS)
Reference number:	7505-068	Vertical datum:	ASVD 02
Description:	American Samoa		

## Baseline Processing Report

### Processing Summary

Observation	From	To	Occupation Start Time	Occupation Stop Time	Solution Type	H. Prec. (Meter)	V. Prec. (Meter)
NWS_R1 --- PI 01 (B7)	NWS_R1	PI 01	6/8/2012 7:25:04 PM	6/8/2012 8:05:02 PM	Fixed	0.011	0.020
AS 44A --- PI 01 (B8)	AS 44A	PI 01	6/8/2012 7:25:04 PM	6/8/2012 8:05:02 PM	Fixed	0.006	0.010
NWS_R1 --- PI 02 (B9)	NWS_R1	PI 02	6/8/2012 8:33:07 PM	6/8/2012 9:03:01 PM	Fixed	0.009	0.022
AS 44A --- PI 02 (B10)	AS 44A	PI 02	6/8/2012 8:33:07 PM	6/8/2012 9:03:01 PM	Fixed	0.014	0.034
ASPA --- PI 02 (B11)	ASPA	PI 02	6/8/2012 8:33:07 PM	6/8/2012 9:03:01 PM	Fixed	0.010	0.023
ASPA --- PI 01 (B12)	ASPA	PI 01	6/8/2012 7:25:04 PM	6/8/2012 8:05:02 PM	Fixed	0.010	0.018
ASPA --- NWS_R1 (B13)	ASPA	NWS_R1	6/8/2012 5:43:31 PM	6/8/2012 9:37:48 PM	Fixed	0.004	0.007
AS 44A --- TP 01 (B16)	AS 44A	TP 01	6/12/2012 6:57:01 PM	6/12/2012 7:27:53 PM	Fixed	0.026	0.021
NWS_R1 --- TP 01 (B17)	NWS_R1	TP 01	6/12/2012 6:57:01 PM	6/12/2012 7:27:53 PM	Fixed	0.026	0.021
AS 44A --- TP 02 (B18)	TP 02	AS 44A	6/12/2012 9:15:13 PM	6/12/2012 9:56:00 PM	Fixed	0.011	0.019
NWS_R1 --- TP 02 (B19)	TP 02	NWS_R1	6/12/2012 9:15:13 PM	6/12/2012 9:56:00 PM	Fixed	0.011	0.014
AS 44A --- BP 01 (B20)	AS 44A	BP 01	6/12/2012 8:00:33 PM	6/12/2012 8:18:40 PM	Fixed	0.014	0.035
PI 03 --- BP 01 (B22)	PI 03	BP 01	6/12/2012 8:00:33 PM	6/12/2012 8:18:40 PM	Fixed	0.004	0.009

NWS_R1 --- PI 03 (B24)	NWS_R1	PI 03	6/12/2012 7:55:12 PM	6/12/2012 8:36:25 PM	Fixed	0.008	0.020
ASPA --- PI 03 (B25)	ASPA	PI 03	6/12/2012 7:55:12 PM	6/12/2012 8:36:25 PM	Fixed	0.012	0.025
ASPA --- TP 02 (B27)	ASPA	TP 02	6/12/2012 9:15:13 PM	6/12/2012 9:56:00 PM	Fixed	0.008	0.012
ASPA --- TP 01 (B28)	ASPA	TP 01	6/12/2012 6:57:01 PM	6/12/2012 7:27:53 PM	Fixed	0.029	0.030
AS 44A --- TP 04 (B32)	AS 44A	TP 04	6/13/2012 8:59:50 PM	6/13/2012 9:36:58 PM	Fixed	0.015	0.034
NWS_R1 --- TP 04 (B33)	NWS_R1	TP 04	6/13/2012 8:59:50 PM	6/13/2012 9:36:58 PM	Fixed	0.007	0.012
NWS_R1 --- BP 02 (B35)	NWS_R1	BP 02	6/13/2012 5:55:17 PM	6/13/2012 6:37:00 PM	Fixed	0.007	0.016
TP 03 --- BP 02 (B36)	TP 03	BP 02	6/13/2012 5:55:17 PM	6/13/2012 6:23:04 PM	Fixed	0.003	0.006
AS 44A --- TP 03 (B37)	AS 44A	TP 03	6/13/2012 5:36:03 PM	6/13/2012 6:23:04 PM	Fixed	0.008	0.018
NWS_R1 --- PI 04 (B40)	NWS_R1	PI 04	6/13/2012 7:37:00 PM	6/13/2012 8:17:25 PM	Fixed	0.009	0.018
PI 04 --- BP 03 (B41)	PI 04	BP 03	6/13/2012 7:37:11 PM	6/13/2012 8:17:00 PM	Fixed	0.003	0.007
AS 44A --- BP 03 (B42)	AS 44A	BP 03	6/13/2012 7:37:11 PM	6/13/2012 8:17:00 PM	Fixed	0.007	0.016
ASPA --- PI 04 (B45)	ASPA	PI 04	6/13/2012 7:59:45 PM	6/13/2012 8:17:25 PM	Fixed	0.011	0.024
ASPA --- TP 04 (B46)	ASPA	TP 04	6/13/2012 8:59:50 PM	6/13/2012 9:36:58 PM	Fixed	0.007	0.012
NWS_R1 --- PI 06 (B50)	PI 06	NWS_R1	6/14/2012 9:36:41 PM	6/14/2012 10:17:34 PM	Fixed	0.006	0.009
PI 06 --- BP 06 (B52)	PI 06	BP 06	6/14/2012 9:36:41 PM	6/14/2012 10:05:43 PM	Fixed	0.002	0.003
AS 44A --- BP 06 (B54)	BP 06	AS 44A	6/14/2012 9:33:25 PM	6/14/2012 10:05:43 PM	Fixed	0.003	0.005
NWS_R1 --- BP 05 (B55)	BP 05	NWS_R1	6/14/2012 7:36:03 PM	6/14/2012 8:16:39 PM	Fixed	0.007	0.015
BP 05 --- PI 05 (B57)	BP 05	PI 05	6/14/2012 7:37:43 PM	6/14/2012 8:16:39 PM	Fixed	0.003	0.007
AS 44A --- PI 05 (B59)	PI 05	AS 44A	6/14/2012 7:37:43 PM	6/14/2012 8:17:39 PM	Fixed	0.006	0.013
AS 44A --- TP 05 (B61)	AS 44A	TP 05	6/14/2012 6:24:56 PM	6/14/2012 7:05:56 PM	Fixed	0.013	0.018
BP 04 --- TP 05 (B62)	BP 04	TP 05	6/14/2012 6:24:56 PM	6/14/2012 7:05:56 PM	Fixed	0.002	0.004
NWS_R1 --- BP 04 (B63)	BP 04	NWS_R1	6/14/2012 6:19:45 PM	6/14/2012 7:08:07 PM	Fixed	0.007	0.013
ASPA --- BP 04 (B65)	ASPA	BP 04	6/14/2012 6:19:45 PM	6/14/2012 7:08:07 PM	Fixed	0.007	0.013



ASPA --- BP 05 (B68)	ASPA	BP 05	6/14/2012 7:36:03 PM	6/14/2012 8:16:39 PM	Fixed	0.007	0.015
ASPA --- PI 06 (B70)	ASPA	PI 06	6/14/2012 9:36:41 PM	6/14/2012 10:17:34 PM	Fixed	0.005	0.007
NWS_R1 --- TP 06 (B74)	TP 06	NWS_R1	6/15/2012 8:12:17 PM	6/15/2012 8:54:24 PM	Fixed	0.008	0.019
AS 44A --- TP 06 (B75)	AS 44A	TP 06	6/15/2012 8:12:17 PM	6/15/2012 8:54:24 PM	Fixed	0.011	0.027
AS 44A --- BP 07 (B77)	AS 44A	BP 07	6/15/2012 6:04:44 PM	6/15/2012 6:45:02 PM	Fixed	0.009	0.017
PI 07 --- BP 07 (B78)	BP 07	PI 07	6/15/2012 6:04:44 PM	6/15/2012 6:35:28 PM	Fixed	0.002	0.005
NWS_R1 --- PI 07 (B79)	NWS_R1	PI 07	6/15/2012 5:54:11 PM	6/15/2012 6:35:28 PM	Fixed	0.005	0.010
ASPA --- BP 07 (B82)	ASPA	BP 07	6/15/2012 6:04:44 PM	6/15/2012 6:45:02 PM	Fixed	0.004	0.008
ASPA --- TP 06 (B83)	ASPA	TP 06	6/15/2012 8:12:17 PM	6/15/2012 8:54:24 PM	Fixed	0.006	0.015
NWS --- AS 44A (B86)	NWS	AS 44A	6/19/2012 5:42:53 PM	6/19/2012 9:21:29 PM	Fixed	0.008	0.034
NWS --- PI 10 (B87)	NWS	PI 10	6/19/2012 8:27:53 PM	6/19/2012 9:07:17 PM	Fixed	0.008	0.018
AS 44A --- PI 10 (B88)	AS 44A	PI 10	6/19/2012 8:27:53 PM	6/19/2012 9:07:17 PM	Fixed	0.012	0.028
AS 44A --- PI 09 (B90)	AS 44A	PI 09	6/19/2012 7:06:42 PM	6/19/2012 7:46:17 PM	Fixed	0.007	0.013
PI 09 --- BP 09 (B91)	PI 09	BP 09	6/19/2012 7:08:53 PM	6/19/2012 7:46:17 PM	Fixed	0.002	0.005
NWS --- BP 09 (B92)	BP 09	NWS	6/19/2012 7:08:53 PM	6/19/2012 7:46:41 PM	Fixed	0.006	0.012
AS 44A --- PI 08 (B95)	AS 44A	PI 08	6/19/2012 6:09:19 PM	6/19/2012 6:51:42 PM	Fixed	0.014	0.023
PI 08 --- BP 08 (B96)	BP 08	PI 08	6/19/2012 6:09:19 PM	6/19/2012 6:48:37 PM	Fixed	0.003	0.006
NWS --- BP 08 (B97)	BP 08	NWS	6/19/2012 6:08:28 PM	6/19/2012 6:48:37 PM	Fixed	0.007	0.013
ASPA --- BP 08 (B99)	ASPA	BP 08	6/19/2012 6:08:28 PM	6/19/2012 6:48:37 PM	Fixed	0.007	0.013
ASPA --- PI 09 (B102)	ASPA	PI 09	6/19/2012 7:06:42 PM	6/19/2012 7:46:17 PM	Fixed	0.007	0.012
ASPA --- PI 10 (B103)	ASPA	PI 10	6/19/2012 8:27:53 PM	6/19/2012 9:07:17 PM	Fixed	0.009	0.022
ASPA --- NWS (B104)	ASPA	NWS	6/19/2012 4:47:43 PM	6/19/2012 9:34:37 PM	Fixed	0.004	0.006
NWS --- NWS_R1 (B106)	NWS	NWS_R1	6/20/2012 1:38:30 PM	6/20/2012 8:34:25 PM	Fixed	0.001	0.001
ASPA --- NWS_R1 (B108)	ASPA	NWS_R1	6/20/2012 1:38:30 PM	6/20/2012 8:34:25 PM	Fixed	0.002	0.003

NWS --- TP 07 (B111)	NWS	TP 07	6/25/2012 6:34:19 PM	6/25/2012 7:14:17 PM	Fixed	0.007	0.013
NWS --- PI 11 (B113)	NWS	PI 11	6/25/2012 8:02:25 PM	6/25/2012 8:38:56 PM	Fixed	0.008	0.014
TP 07 --- BP 16 (B114)	TP 07	BP 16	6/25/2012 6:39:46 PM	6/25/2012 7:14:17 PM	Fixed	0.003	0.007
AS 44A --- BP 16 (B115)	AS 44A	BP 16	6/25/2012 6:39:46 PM	6/25/2012 7:16:48 PM	Fixed	0.008	0.018
AS 44A --- BP 12 (B117)	AS 44A	BP 12	6/25/2012 9:07:19 PM	6/25/2012 9:52:21 PM	Fixed	0.008	0.011
NWS --- BP 12 (B118)	NWS	BP 12	6/25/2012 9:07:19 PM	6/25/2012 9:52:21 PM	Fixed	0.007	0.010
BP 11 --- PI 11 (B119)	BP 11	PI 11	6/25/2012 8:04:40 PM	6/25/2012 8:38:56 PM	Fixed	0.003	0.006
AS 44A --- BP 11 (B120)	AS 44A	BP 11	6/25/2012 8:04:40 PM	6/25/2012 8:41:20 PM	Fixed	0.010	0.021
ASPA --- BP 11 (B122)	ASPA	BP 11	6/25/2012 8:04:40 PM	6/25/2012 8:41:20 PM	Fixed	0.008	0.015
ASPA --- BP 12 (B123)	ASPA	BP 12	6/25/2012 9:07:19 PM	6/25/2012 9:52:21 PM	Fixed	0.008	0.011
ASPA --- TP 07 (B126)	ASPA	TP 07	6/25/2012 6:34:19 PM	6/25/2012 7:14:17 PM	Fixed	0.008	0.016
AS 44A --- BP 13 (B130)	BP 13	AS 44A	6/27/2012 7:13:43 PM	6/27/2012 7:56:31 PM	Fixed	0.009	0.023
NWS --- BP 13 (B131)	NWS	BP 13	6/27/2012 7:13:43 PM	6/27/2012 7:56:31 PM	Fixed	0.009	0.023
ASPA --- BP 13 (B132)	BP 13	ASPA	6/27/2012 7:13:43 PM	6/27/2012 7:56:31 PM	Fixed	0.010	0.024
AS 44A --- PI 12 (B136)	PI 12	AS 44A	7/2/2012 5:54:18 PM	7/2/2012 6:38:19 PM	Fixed	0.009	0.017
NWS --- PI 12 (B137)	NWS	PI 12	7/2/2012 5:54:18 PM	7/2/2012 6:38:19 PM	Fixed	0.009	0.016
AS 44A --- PI 13 (B138)	PI 13	AS 44A	7/2/2012 7:01:36 PM	7/2/2012 7:40:45 PM	Fixed	0.011	0.027
NWS --- PI 13 (B139)	NWS	PI 13	7/2/2012 7:01:36 PM	7/2/2012 7:40:45 PM	Fixed	0.010	0.023
AS 44A --- PI 14 (B140)	PI 14	AS 44A	7/2/2012 7:58:47 PM	7/2/2012 8:38:23 PM	Fixed	0.012	0.021
NWS --- PI 14 (B141)	NWS	PI 14	7/2/2012 7:58:47 PM	7/2/2012 8:38:23 PM	Fixed	0.010	0.018
AS 44A --- BP 14 (B142)	BP 14	AS 44A	7/2/2012 8:54:05 PM	7/2/2012 9:35:51 PM	Fixed	0.007	0.012
NWS --- BP 14 (B143)	NWS	BP 14	7/2/2012 8:54:05 PM	7/2/2012 9:35:51 PM	Fixed	0.008	0.012
AS 44A --- BP 15 (B145)	BP 15	AS 44A	7/2/2012 9:28:35 PM	7/2/2012 10:08:13 PM	Fixed	0.009	0.023
NWS --- BP 15 (B146)	NWS	BP 15	7/2/2012 9:28:35 PM	7/2/2012 10:08:13 PM	Fixed	0.009	0.022

ASPA --- BP 15 (B147)	BP 15	ASPA	7/2/2012 9:28:35 PM	7/2/2012 10:08:13 PM	Fixed	0.009	0.023
ASPA --- BP 14 (B148)	BP 14	ASPA	7/2/2012 8:54:05 PM	7/2/2012 9:35:51 PM	Fixed	0.008	0.012
ASPA --- PI 14 (B149)	PI 14	ASPA	7/2/2012 7:58:47 PM	7/2/2012 8:38:23 PM	Fixed	0.010	0.018
ASPA --- PI 12 (B151)	PI 12	ASPA	7/2/2012 5:54:18 PM	7/2/2012 6:38:19 PM	Fixed	0.010	0.017
AS 44A --- PI 16 (B155)	PI 16	AS 44A	7/5/2012 5:40:45 PM	7/5/2012 6:23:20 PM	Fixed	0.008	0.015
NWS --- PI 16 (B156)	NWS	PI 16	7/5/2012 5:40:45 PM	7/5/2012 6:23:20 PM	Fixed	0.008	0.015
AS 44A --- BP 17 (B157)	AS 44A	BP 17	7/5/2012 6:47:20 PM	7/5/2012 7:26:52 PM	Fixed	0.033	0.059
NWS --- BP 17 (B158)	NWS	BP 17	7/5/2012 6:47:20 PM	7/5/2012 7:26:52 PM	Fixed	0.011	0.021
AS 44A --- PI 15 (B159)	PI 15	AS 44A	7/5/2012 7:58:26 PM	7/5/2012 8:37:57 PM	Fixed	0.019	0.030
NWS --- PI 15 (B160)	NWS	PI 15	7/5/2012 7:58:26 PM	7/5/2012 8:37:57 PM	Fixed	0.058	0.088
ASPA --- PI 15 (B161)	ASPA	PI 15	7/5/2012 7:58:26 PM	7/5/2012 8:37:57 PM	Fixed	0.012	0.020
ASPA --- BP 17 (B162)	BP 17	ASPA	7/5/2012 6:47:20 PM	7/5/2012 7:26:52 PM	Fixed	0.011	0.020
ASPA --- PI 16 (B163)	PI 16	ASPA	7/5/2012 5:40:45 PM	7/5/2012 6:23:20 PM	Fixed	0.010	0.019
NWS --- TP 08 (B169)	NWS	TP 08	7/6/2012 6:16:58 PM	7/6/2012 7:03:11 PM	Fixed	0.008	0.020
AS 44A --- TP 08 (B170)	AS 44A	TP 08	7/6/2012 6:16:58 PM	7/6/2012 7:03:11 PM	Fixed	0.007	0.019
AS 44A --- PI 19 (B172)	AS 44A	PI 19	7/6/2012 7:36:19 PM	7/6/2012 8:06:38 PM	Fixed	0.022	0.042
BP 19 --- PI 19 (B173)	BP 19	PI 19	7/6/2012 7:36:19 PM	7/6/2012 8:06:38 PM	Fixed	0.006	0.009
NWS --- BP 19 (B174)	NWS	BP 19	7/6/2012 7:34:16 PM	7/6/2012 8:07:32 PM	Fixed	0.010	0.020
ASPA --- BP 19 (B176)	ASPA	BP 19	7/6/2012 7:34:16 PM	7/6/2012 8:07:32 PM	Fixed	0.014	0.027
ASPA --- TP 08 (B178)	ASPA	TP 08	7/6/2012 6:16:58 PM	7/6/2012 7:03:11 PM	Fixed	0.008	0.020

### Acceptance Summary

Processed	Passed	Flag	Fail
105	105	0	0

**Photo Science Inc.**

523 Wellington Way  
 Suite 375  
 Lexington, Kentucky 40503  
 USA

Phone: 859-277-8700  
 Fax: 859-277-8901  
 www.photoscience.com

**Project Information**

Name: C:\TBC\7505-068\_AMSAM\7505-068.vce  
 Size: 2 MB  
 Modified: 10/31/2012 10:51:51 AM (UTC:-4)  
 Time zone: Eastern Standard Time  
 Reference number: 7505-068  
 Description: American Samoa

**Coordinate System**

Name: UTM  
 Datum: NAD 1983 (PACP00 Epoch  
 2002.0)  
 Zone: 2 South (171W)  
 Geoid: GEOID09 (AS)  
 Vertical datum: ASVD 02

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## Network Adjustment Report

### Adjustment Settings

**Set-Up Errors****GNSS**

**Error in Height of Antenna:** 0.003 m

**Centering Error:** 0.003 m

**Covariance Display****Horizontal:**

**Propagated Linear Error [E]:** U.S.

**Constant Term [C]:** 0.000 m

**Scale on Linear Error [S]:** 1.960

**Three-Dimensional**

**Propagated Linear Error [E]:** U.S.

**Constant Term [C]:** 0.000 m

**Scale on Linear Error [S]:** 1.960

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### Adjustment Statistics

**Number of Iterations for Successful Adjustment:** 2  
**Network Reference Factor:** 1.00  
**Chi Square Test (95%):** Passed  
**Precision Confidence Level:** 95%  
**Degrees of Freedom:** 183

### Post Processed Vector Statistics

**Reference Factor:** 1.00  
**Redundancy Number:** 183.00  
**A Priori Scalar:** 3.09

## Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	$\Delta$ Easting (Meter)	$\Delta$ Northing (Meter)	$\Delta$ Elevation (Meter)	$\Delta$ Height (Meter)
<a href="#">ASPA</a>	?	?	?	-0.040
<a href="#">NWS</a>	?	?	?	-0.024

## Control Point Constraints

Point ID	Type	East $\sigma$ (Meter)	North $\sigma$ (Meter)	Height $\sigma$ (Meter)	Elevation $\sigma$ (Meter)
<a href="#">AS 44A</a>	Grid	Fixed	Fixed		Fixed
<a href="#">ASPA</a>	Local	Fixed	Fixed		
<a href="#">NWS</a>	Grid				Fixed
<a href="#">NWS</a>	Local	Fixed	Fixed		

Fixed = 0.000001(Meter)

## Adjusted Grid Coordinates

Point ID	Easting (Meter)	Easting Error (Meter)	Northing (Meter)	Northing Error (Meter)	Elevation (Meter)	Elevation Error (Meter)	Constraint
<a href="#">AS 44A</a>	527867.780	?	8416665.024	?	45.249	?	ENe
<a href="#">ASPA</a>	529934.701	?	8416189.447	?	19.853	0.012	LL

<a href="#">BP 01</a>	518261.580	0.041	8416285.870	0.040	4.037	0.055	
<a href="#">BP 02</a>	526389.464	0.027	8413732.735	0.028	91.139	0.044	
<a href="#">BP 03</a>	523912.397	0.029	8412588.136	0.029	5.664	0.041	
<a href="#">BP 04</a>	524619.307	0.025	8417510.222	0.024	400.182	0.032	
<a href="#">BP 05</a>	526532.791	0.021	8416324.691	0.020	153.368	0.033	
<a href="#">BP 06</a>	527951.435	0.021	8416737.742	0.021	44.263	0.023	
<a href="#">BP 07</a>	528921.725	0.018	8415567.133	0.018	21.321	0.027	
<a href="#">BP 08</a>	531268.328	0.021	8417915.313	0.020	5.372	0.031	
<a href="#">BP 09</a>	532320.453	0.023	8417363.263	0.023	2.487	0.032	
<a href="#">BP 11</a>	532285.703	0.027	8421966.917	0.028	1.597	0.035	
<a href="#">BP 12</a>	536277.095	0.029	8420756.650	0.030	2.481	0.024	
<a href="#">BP 13</a>	537580.264	0.032	8420293.639	0.032	6.165	0.044	
<a href="#">BP 14</a>	541397.230	0.043	8423230.265	0.045	180.221	0.026	
<a href="#">BP 15</a>	539769.211	0.038	8421192.719	0.038	2.944	0.043	
<a href="#">BP 16</a>	534679.426	0.031	8420910.158	0.031	2.770	0.038	
<a href="#">BP 17</a>	536496.175	0.039	8424764.391	0.038	93.399	0.046	
<a href="#">BP 19</a>	546085.494	0.054	8422212.250	0.057	2.289	0.049	
<a href="#">NWS</a>	530818.516	?	8415561.660	?	3.823	?	LLe
<a href="#">NWS R1</a>	530808.909	0.010	8415580.874	0.010	3.919	0.014	
<a href="#">PI 01</a>	527419.910	0.020	8416094.287	0.019	68.272	0.031	
<a href="#">PI 02</a>	523739.430	0.026	8414544.913	0.025	32.320	0.047	
<a href="#">PI 03</a>	518220.328	0.039	8416314.713	0.038	3.713	0.047	
<a href="#">PI 04</a>	523910.050	0.028	8412557.202	0.028	4.787	0.040	
<a href="#">PI 05</a>	526521.752	0.023	8416355.979	0.022	154.661	0.035	
<a href="#">PI 06</a>	527967.141	0.019	8416727.465	0.019	44.044	0.023	
<a href="#">PI 07</a>	528926.508	0.022	8415546.013	0.022	20.955	0.031	
<a href="#">PI 08</a>	531255.270	0.027	8417925.382	0.026	6.132	0.040	
<a href="#">PI 09</a>	532328.896	0.021	8417391.923	0.020	2.553	0.029	
<a href="#">PI 10</a>	533244.258	0.022	8418410.246	0.024	3.931	0.042	
<a href="#">PI 11</a>	532317.939	0.030	8421964.693	0.030	1.706	0.037	
<a href="#">PI 12</a>	537278.167	0.032	8420685.077	0.032	5.684	0.033	
<a href="#">PI 13</a>	540101.028	0.042	8421501.103	0.042	2.554	0.057	
<a href="#">PI 14</a>	541482.724	0.043	8422629.686	0.045	3.087	0.037	
<a href="#">PI 15</a>	535271.225	0.041	8425119.565	0.042	2.754	0.052	
<a href="#">PI 16</a>	537144.521	0.034	8422742.051	0.035	254.190	0.032	
<a href="#">PI 19</a>	546063.486	0.058	8422206.243	0.061	2.589	0.057	
<a href="#">TP 01</a>	518736.459	0.042	8418151.413	0.046	47.412	0.043	
<a href="#">TP 02</a>	522475.915	0.027	8415347.909	0.028	4.076	0.030	

	526379.000	0.027	8413729.945	0.027	91.294	0.045	
<a href="#">TP 04</a>	528688.126	0.021	8413563.344	0.021	18.617	0.032	
<a href="#">TP 05</a>	524647.998	0.028	8417506.472	0.027	401.317	0.037	
<a href="#">TP 06</a>	530292.817	0.019	8417525.558	0.018	8.946	0.038	
<a href="#">TP 07</a>	534713.952	0.028	8420899.732	0.028	2.904	0.032	
<a href="#">TP 08</a>	542510.426	0.044	8421248.330	0.044	32.694	0.038	

## Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (Meter)	Height Error (Meter)	Constraint
<a href="#">AS 44A</a>	S14°19'18.58306"	W170°44'29.68821"	78.692	?	ENe
<a href="#">ASPA</a>	S14°19'33.98521"	W170°43'20.66960"	53.268	0.012	LL
<a href="#">BP 01</a>	S14°19'31.21332"	W170°49'50.36205"	37.185	0.055	
<a href="#">BP 02</a>	S14°20'54.08128"	W170°45'18.93506"	124.453	0.044	
<a href="#">BP 03</a>	S14°21'31.41929"	W170°46'41.59976"	38.870	0.041	
<a href="#">BP 04</a>	S14°18'51.18290"	W170°46'18.15933"	433.534	0.032	
<a href="#">BP 05</a>	S14°19'29.70820"	W170°45'14.24187"	186.790	0.033	
<a href="#">BP 06</a>	S14°19'16.21305"	W170°44'26.89827"	77.707	0.023	
<a href="#">BP 07</a>	S14°19'54.28034"	W170°43'54.46213"	54.717	0.027	
<a href="#">BP 08</a>	S14°18'37.75522"	W170°42'36.22070"	38.797	0.031	
<a href="#">BP 09</a>	S14°18'55.68085"	W170°42'01.07586"	35.879	0.032	
<a href="#">BP 11</a>	S14°16'25.83362"	W170°42'02.43410"	34.995	0.035	
<a href="#">BP 12</a>	S14°17'05.04996"	W170°39'49.16068"	35.926	0.024	
<a href="#">BP 13</a>	S14°17'20.05834"	W170°39'05.64148"	39.561	0.044	
<a href="#">BP 14</a>	S14°15'44.27604"	W170°36'58.40218"	213.472	0.026	
<a href="#">BP 15</a>	S14°16'50.68347"	W170°37'52.62727"	36.266	0.043	
<a href="#">BP 16</a>	S14°17'00.12694"	W170°40'42.49336"	36.253	0.038	
<a href="#">BP 17</a>	S14°14'54.58802"	W170°39'42.04307"	126.612	0.046	
<a href="#">BP 19</a>	S14°16'17.14591"	W170°34'21.87581"	35.337	0.049	
<a href="#">NWS</a>	S14°19'54.38461"	W170°42'51.13897"	37.198	?	LLe
<a href="#">NWS R1</a>	S14°19'53.75957"	W170°42'51.46050"	37.295	0.014	
<a href="#">PI 01</a>	S14°19'37.17667"	W170°44'44.61845"	101.693	0.031	
<a href="#">PI 02</a>	S14°20'27.73159"	W170°46'47.43707"	65.593	0.047	
<a href="#">PI 03</a>	S14°19'30.27546"	W170°49'51.73990"	36.860	0.047	
<a href="#">PI 04</a>	S14°21'32.42628"	W170°46'41.67714"	37.991	0.040	

<a href="#">PI 05</a>	S14°19'28.69017"	W170°45'14.61149"	188.083	0.035	
<a href="#">PI 06</a>	S14°19'16.54699"	W170°44'26.37360"	77.488	0.023	
<a href="#">PI 07</a>	S14°19'54.96762"	W170°43'54.30161"	54.350	0.031	
<a href="#">PI 08</a>	S14°18'37.42802"	W170°42'36.65702"	39.558	0.040	
<a href="#">PI 09</a>	S14°18'54.74760"	W170°42'00.79524"	35.946	0.029	
<a href="#">PI 10</a>	S14°18'21.56221"	W170°41'30.28410"	37.371	0.042	
<a href="#">PI 11</a>	S14°16'25.90466"	W170°42'01.35811"	35.105	0.037	
<a href="#">PI 12</a>	S14°17'07.33179"	W170°39'15.74423"	39.094	0.033	
<a href="#">PI 13</a>	S14°16'40.62843"	W170°37'41.56889"	35.867	0.057	
<a href="#">PI 14</a>	S14°16'03.82016"	W170°36'55.51579"	36.353	0.037	
<a href="#">PI 15</a>	S14°14'43.08410"	W170°40'22.93849"	35.920	0.052	
<a href="#">PI 16</a>	S14°16'00.38407"	W170°39'20.30671"	287.547	0.032	
<a href="#">PI 19</a>	S14°16'17.34277"	W170°34'22.60995"	35.638	0.057	
<a href="#">TP 01</a>	S14°18'30.47809"	W170°49'34.55560"	80.522	0.043	
<a href="#">TP 02</a>	S14°20'01.63212"	W170°47'29.64464"	37.338	0.030	
<a href="#">TP 03</a>	S14°20'54.17244"	W170°45'19.28431"	124.608	0.045	
<a href="#">TP 04</a>	S14°20'59.51229"	W170°44'02.18369"	51.906	0.032	
<a href="#">TP 05</a>	S14°18'51.30403"	W170°46'17.20144"	434.671	0.037	
<a href="#">TP 06</a>	S14°18'50.48082"	W170°43'08.76854"	42.377	0.038	
<a href="#">TP 07</a>	S14°17'00.46478"	W170°40'41.34053"	36.386	0.032	
<a href="#">TP 08</a>	S14°16'48.72682"	W170°36'21.13867"	65.940	0.038	

## Adjusted ECEF Coordinates

Point ID	X (Meter)	X Error (Meter)	Y (Meter)	Y Error (Meter)	Z (Meter)	Z Error (Meter)	3D Error (Meter)	Constraint
<a href="#">AS 44A</a>	-6100732.960	?	-994485.486	?	-1567525.771	?	?	ENe
<a href="#">ASPA</a>	-6100259.957	?	-996503.954	?	-1567978.140	?	?	LL
<a href="#">BP 01</a>	-6102137.177	0.054	-984977.947	0.041	-1567891.616	0.041	0.079	
<a href="#">BP 02</a>	-6100296.719	0.042	-992919.250	0.028	-1570380.804	0.030	0.059	
<a href="#">BP 03</a>	-6100331.514	0.040	-990415.479	0.030	-1571471.328	0.030	0.058	
<a href="#">BP 04</a>	-6101800.042	0.030	-991365.616	0.026	-1566797.534	0.025	0.047	
<a href="#">BP 05</a>	-6100967.515	0.032	-993170.929	0.021	-1567883.812	0.021	0.044	
<a href="#">BP 06</a>	-6100736.350	0.023	-994570.750	0.021	-1567454.951	0.021	0.038	
<a href="#">BP 07</a>	-6100272.162	0.025	-995479.894	0.019	-1568582.849	0.020	0.037	
<a href="#">BP 08</a>	-6100453.025	0.030	-997885.234	0.023	-1566300.062	0.021	0.043	



<a href="#">BP 09</a>	-6100145.710	0.032	-998902.190	0.024	-1566833.168	0.024	0.046	
<a href="#">BP 11</a>	-6101273.614	0.034	-999045.632	0.027	-1562370.125	0.029	0.052	
<a href="#">BP 12</a>	-6100334.376	0.025	-1002939.544	0.029	-1563538.394	0.030	0.049	
<a href="#">BP 13</a>	-6100013.790	0.044	-1004208.694	0.031	-1563986.294	0.034	0.063	
<a href="#">BP 14</a>	-6100275.635	0.028	-1008117.276	0.043	-1561176.264	0.043	0.067	
<a href="#">BP 15</a>	-6099874.573	0.042	-1006403.675	0.038	-1563110.586	0.039	0.069	
<a href="#">BP 16</a>	-6100630.648	0.038	-1001368.281	0.032	-1563391.848	0.031	0.058	
<a href="#">BP 17</a>	-6101361.507	0.047	-1003324.645	0.038	-1559674.757	0.039	0.072	
<a href="#">BP 19</a>	-6099092.947	0.046	-1012677.191	0.054	-1562111.445	0.059	0.092	
<a href="#">NWS</a>	-6099948.729	?	-997349.759	?	-1568581.618	?	?	LLe
<a href="#">NWS_R1</a>	-6099955.069	0.014	-997341.033	0.010	-1568563.029	0.010	0.020	
<a href="#">PI 01</a>	-6100687.378	0.029	-994024.736	0.021	-1568085.159	0.020	0.041	
<a href="#">PI 02</a>	-6100863.952	0.046	-990324.718	0.025	-1569581.625	0.028	0.060	
<a href="#">PI 03</a>	-6102150.486	0.046	-984938.271	0.039	-1567863.607	0.039	0.072	
<a href="#">PI 04</a>	-6100323.468	0.039	-990411.824	0.029	-1571501.092	0.028	0.056	
<a href="#">PI 05</a>	-6100978.172	0.035	-993161.441	0.023	-1567853.816	0.023	0.048	
<a href="#">PI 06</a>	-6100731.105	0.022	-994585.826	0.019	-1567464.841	0.019	0.035	
<a href="#">PI 07</a>	-6100265.876	0.029	-995483.742	0.023	-1568603.224	0.023	0.044	
<a href="#">PI 08</a>	-6100458.316	0.037	-997872.849	0.029	-1566290.506	0.028	0.055	
<a href="#">PI 09</a>	-6100151.413	0.028	-998911.646	0.021	-1566805.392	0.021	0.041	
<a href="#">PI 10</a>	-6100253.731	0.038	-999854.982	0.023	-1565817.470	0.028	0.053	
<a href="#">PI 11</a>	-6101267.976	0.036	-999077.390	0.029	-1562372.268	0.031	0.056	
<a href="#">PI 12</a>	-6100157.766	0.033	-1003925.519	0.033	-1563607.137	0.032	0.056	
<a href="#">PI 13</a>	-6099895.433	0.057	-1006743.052	0.041	-1562811.004	0.044	0.083	
<a href="#">PI 14</a>	-6099946.137	0.035	-1008150.516	0.044	-1561714.777	0.045	0.072	
<a href="#">PI 15</a>	-6101559.435	0.047	-1002114.785	0.043	-1559309.748	0.045	0.078	
<a href="#">PI 16</a>	-6100918.220	0.032	-1003912.066	0.035	-1561674.332	0.035	0.059	
<a href="#">PI 19</a>	-6099095.368	0.054	-1012655.286	0.059	-1562117.383	0.064	0.102	
<a href="#">TP 01</a>	-6102558.822	0.047	-985525.848	0.041	-1566093.655	0.043	0.076	
<a href="#">TP 02</a>	-6101235.529	0.029	-989103.696	0.027	-1568797.464	0.029	0.049	
<a href="#">TP 03</a>	-6100297.864	0.042	-992908.834	0.027	-1570383.557	0.030	0.059	
<a href="#">TP 04</a>	-6099816.635	0.031	-995171.131	0.021	-1570524.537	0.022	0.043	
<a href="#">TP 05</a>	-6101795.617	0.035	-991393.982	0.029	-1566801.423	0.029	0.054	
<a href="#">TP 06</a>	-6100518.416	0.037	-996907.558	0.019	-1566679.918	0.021	0.046	
<a href="#">TP 07</a>	-6100622.651	0.032	-1001401.984	0.028	-1563401.943	0.028	0.051	
<a href="#">TP 08</a>	-6099470.590	0.039	-1009116.285	0.043	-1563059.628	0.044	0.073	

## Error Ellipse Components

Point ID	Semi-major axis (Meter)	Semi-minor axis (Meter)	Azimuth
<a href="#">BP 01</a>	0.052	0.049	60°
<a href="#">BP 02</a>	0.035	0.034	176°
<a href="#">BP 03</a>	0.037	0.036	61°
<a href="#">BP 04</a>	0.031	0.030	64°
<a href="#">BP 05</a>	0.026	0.025	69°
<a href="#">BP 06</a>	0.027	0.026	170°
<a href="#">BP 07</a>	0.023	0.022	25°
<a href="#">BP 08</a>	0.026	0.025	79°
<a href="#">BP 09</a>	0.029	0.029	65°
<a href="#">BP 11</a>	0.035	0.034	37°
<a href="#">BP 12</a>	0.038	0.036	159°
<a href="#">BP 13</a>	0.041	0.039	56°
<a href="#">BP 14</a>	0.056	0.054	177°
<a href="#">BP 15</a>	0.047	0.047	152°
<a href="#">BP 16</a>	0.039	0.039	25°
<a href="#">BP 17</a>	0.050	0.046	50°
<a href="#">BP 19</a>	0.071	0.067	1°
<a href="#">NWS R1</a>	0.013	0.012	71°
<a href="#">PI 01</a>	0.025	0.023	65°
<a href="#">PI 02</a>	0.034	0.031	63°
<a href="#">PI 03</a>	0.049	0.047	66°
<a href="#">PI 04</a>	0.036	0.034	64°
<a href="#">PI 05</a>	0.029	0.028	69°
<a href="#">PI 06</a>	0.024	0.023	162°
<a href="#">PI 07</a>	0.028	0.028	52°
<a href="#">PI 08</a>	0.035	0.032	61°
<a href="#">PI 09</a>	0.026	0.025	59°
<a href="#">PI 10</a>	0.030	0.027	172°
<a href="#">PI 11</a>	0.038	0.037	35°
<a href="#">PI 12</a>	0.041	0.039	47°
<a href="#">PI 13</a>	0.054	0.051	55°
<a href="#">PI 14</a>	0.056	0.054	172°
<a href="#">PI 15</a>	0.053	0.050	151°

<a href="#">PI 16</a>	0.044	0.043	10°
<a href="#">PI 19</a>	0.077	0.072	2°
<a href="#">TP 01</a>	0.062	0.047	145°
<a href="#">TP 02</a>	0.035	0.033	15°
<a href="#">TP 03</a>	0.034	0.033	4°
<a href="#">TP 04</a>	0.026	0.026	45°
<a href="#">TP 05</a>	0.037	0.033	53°
<a href="#">TP 06</a>	0.025	0.022	70°
<a href="#">TP 07</a>	0.035	0.034	41°
<a href="#">TP 08</a>	0.056	0.054	28°

## Adjusted GPS Observations

### Transformation Parameters

Azimuth Rotation: -0.121 sec (95%) 0.599 sec  
Scale Factor: 1.00000194 (95%) 0.00000288

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
<a href="#">NWS --&gt; TP 08 (PV169)</a>	Az.	63°59'32"	0.274 sec	0.130 sec	0.683
	$\Delta$ Ht.	28.739 m	0.038 m	0.217 m	7.835
	Ellip Dist.	13006.457 m	0.019 m	0.004 m	0.321
<a href="#">AS 44A --&gt; TP 08 (PV170)</a>	Az.	72°33'20"	0.234 sec	-0.069 sec	-0.442
	$\Delta$ Ht.	-12.756 m	0.038 m	-0.203 m	-7.776
	Ellip Dist.	15349.070 m	0.019 m	-0.001 m	-0.063
<a href="#">NWS --&gt; BP 19 (PV174)</a>	Az.	66°23'26"	0.313 sec	-0.044 sec	-0.273
	$\Delta$ Ht.	-1.866 m	0.049 m	0.130 m	5.779
	Ellip Dist.	16658.978 m	0.022 m	0.000 m	-0.022
<a href="#">BP 19 --&gt; PI 19 (PV173)</a>	Az.	254°37'35"	234.232 sec	181.067 sec	2.868
	$\Delta$ Ht.	0.301 m	0.035 m	0.027 m	5.037
	Ellip Dist.	22.822 m	0.025 m	0.010 m	1.403
<a href="#">AS 44A --&gt; PI 19 (PV172)</a>	Az.	72°59'56"	0.352 sec	-0.099 sec	-0.358
	$\Delta$ Ht.	-43.059 m	0.057 m	-0.220 m	-3.630

	<b>Ellip Dist.</b>	19027.992 m	0.028 m	-0.003 m	-0.185
<a href="#">ASPA --&gt; BP 19 (PV176)</a>	<b>Az.</b>	69°28'50"	0.302 sec	-0.330 sec	-1.582
	<b>ΔHt.</b>	-17.936 m	0.050 m	-0.107 m	-2.919
	<b>Ellip Dist.</b>	17243.786 m	0.022 m	-0.013 m	-0.921
<a href="#">AS 44A --&gt; TP 01 (PV16)</a>	<b>Az.</b>	279°10'54"	0.718 sec	0.220 sec	0.463
	<b>ΔHt.</b>	1.833 m	0.043 m	0.041 m	1.498
	<b>Ellip Dist.</b>	9255.127 m	0.032 m	0.025 m	1.017
<a href="#">BP 17 --&gt; ASPA (PV162)</a>	<b>Az.</b>	217°20'22"	0.364 sec	-0.311 sec	-1.303
	<b>ΔHt.</b>	-73.343 m	0.047 m	-0.006 m	-0.234
	<b>Ellip Dist.</b>	10801.494 m	0.025 m	-0.008 m	-0.570
<a href="#">NWS --&gt; NWS_R1 (PV106)</a>	<b>Az.</b>	333°21'49"	97.588 sec	77.710 sec	0.672
	<b>ΔHt.</b>	0.097 m	0.014 m	-0.014 m	-1.226
	<b>Ellip Dist.</b>	21.491 m	0.010 m	-0.014 m	-1.186
<a href="#">ASPA --&gt; TP 01 (PV28)</a>	<b>Az.</b>	279°52'08"	0.579 sec	-0.257 sec	-0.481
	<b>ΔHt.</b>	27.258 m	0.043 m	-0.053 m	-1.196
	<b>Ellip Dist.</b>	11373.255 m	0.032 m	-0.006 m	-0.298
<a href="#">ASPA --&gt; TP 07 (PV126)</a>	<b>Az.</b>	45°20'52"	0.573 sec	-0.423 sec	-1.155
	<b>ΔHt.</b>	-16.883 m	0.033 m	-0.018 m	-0.792
	<b>Ellip Dist.</b>	6712.877 m	0.020 m	-0.014 m	-1.068
<a href="#">AS 44A --&gt; BP 17 (PV157)</a>	<b>Az.</b>	46°44'52"	0.342 sec	0.487 sec	1.127
	<b>ΔHt.</b>	47.918 m	0.046 m	-0.103 m	-1.143
	<b>Ellip Dist.</b>	11838.787 m	0.026 m	0.035 m	0.837
<a href="#">ASPA --&gt; NWS (PV104)</a>	<b>Az.</b>	125°19'05"	0.599 sec	1.642 sec	0.620
	<b>ΔHt.</b>	-16.070 m	0.012 m	0.011 m	0.767
	<b>Ellip Dist.</b>	1084.507 m	0.003 m	-0.016 m	-1.133
<a href="#">BP 09 --&gt; NWS (PV92)</a>	<b>Az.</b>	219°44'34"	1.923 sec	0.156 sec	0.187
	<b>ΔHt.</b>	1.319 m	0.032 m	0.018 m	1.093
	<b>Ellip Dist.</b>	2346.451 m	0.022 m	0.003 m	0.314
<a href="#">PI 09 --&gt; BP 09 (PV91)</a>	<b>Az.</b>	196°20'28"	146.909 sec	12.496 sec	0.232
	<b>ΔHt.</b>	-0.066 m	0.026 m	0.008 m	1.087
	<b>Ellip Dist.</b>	29.890 m	0.021 m	0.002 m	0.214

<a href="#">NWS --&gt; AS 44A (PV86)</a>	<b>Az.</b>	290°25'53"	0.599 sec	-0.483 sec	-0.492
	<b>ΔHt.</b>	41.495 m	0.000 m	-0.034 m	-0.609
	<b>Ellip Dist.</b>	3151.499 m	0.009 m	0.016 m	1.079
<a href="#">AS 44A --&gt; PI 09 (PV90)</a>	<b>Az.</b>	80°40'54"	0.844 sec	0.323 sec	0.615
	<b>ΔHt.</b>	-42.747 m	0.029 m	0.021 m	1.067
	<b>Ellip Dist.</b>	4521.698 m	0.019 m	0.009 m	0.726
<a href="#">NWS --&gt; BP 13 (PV131)</a>	<b>Az.</b>	54°56'40"	0.437 sec	0.297 sec	0.990
	<b>ΔHt.</b>	2.361 m	0.044 m	-0.011 m	-0.366
	<b>Ellip Dist.</b>	8256.218 m	0.020 m	0.011 m	0.766
<a href="#">ASPA --&gt; BP 11 (PV122)</a>	<b>Az.</b>	22°04'27"	0.655 sec	-0.389 sec	-0.980
	<b>ΔHt.</b>	-18.273 m	0.035 m	0.001 m	0.061
	<b>Ellip Dist.</b>	6239.906 m	0.021 m	0.001 m	0.089
<a href="#">AS 44A --&gt; BP 07 (PV77)</a>	<b>Az.</b>	136°06'22"	2.532 sec	-0.737 sec	-0.388
	<b>ΔHt.</b>	-23.976 m	0.027 m	0.025 m	0.925
	<b>Ellip Dist.</b>	1522.485 m	0.018 m	0.011 m	0.909
<a href="#">AS 44A --&gt; BP 12 (PV117)</a>	<b>Az.</b>	63°59'26"	0.420 sec	-0.063 sec	-0.216
	<b>ΔHt.</b>	-42.768 m	0.024 m	0.003 m	0.191
	<b>Ellip Dist.</b>	9355.501 m	0.018 m	0.011 m	0.908
<a href="#">AS 44A --&gt; PI 10 (PV88)</a>	<b>Az.</b>	71°57'09"	0.752 sec	0.551 sec	0.907
	<b>ΔHt.</b>	-41.323 m	0.042 m	0.016 m	0.394
	<b>Ellip Dist.</b>	5654.823 m	0.019 m	0.003 m	0.223
<a href="#">BP 13 --&gt; ASPA (PV132)</a>	<b>Az.</b>	241°41'12"	0.401 sec	-0.245 sec	-0.844
	<b>ΔHt.</b>	13.709 m	0.045 m	0.001 m	0.029
	<b>Ellip Dist.</b>	8680.834 m	0.020 m	-0.013 m	-0.883
<a href="#">AS 44A --&gt; TP 06 (PV75)</a>	<b>Az.</b>	70°23'55"	1.398 sec	0.915 sec	0.879
	<b>ΔHt.</b>	-36.316 m	0.038 m	-0.003 m	-0.077
	<b>Ellip Dist.</b>	2574.191 m	0.020 m	0.014 m	0.883
<a href="#">NWS --&gt; TP 07 (PV111)</a>	<b>Az.</b>	36°02'57"	0.594 sec	0.308 sec	0.853
	<b>ΔHt.</b>	-0.812 m	0.032 m	-0.002 m	-0.109
	<b>Ellip Dist.</b>	6610.828 m	0.020 m	0.001 m	0.075
<a href="#">BP 08 --&gt; NWS (PV97)</a>	<b>Az.</b>	190°44'52"	1.735 sec	0.148 sec	0.144

	<b>ΔHt.</b>	-1.600 m	0.031 m	0.015 m	0.846
	<b>Ellip Dist.</b>	2397.176 m	0.019 m	0.002 m	0.217
<a href="#">ASPA --&gt; TP 06 (PV83)</a>	<b>Az.</b>	14°56'08"	2.774 sec	-1.423 sec	-0.837
	<b>ΔHt.</b>	-10.891 m	0.038 m	-0.003 m	-0.175
	<b>Ellip Dist.</b>	1383.807 m	0.018 m	0.001 m	0.118
<a href="#">PI 04 --&gt; BP 03 (PV41)</a>	<b>Az.</b>	4°17'04"	147.665 sec	9.918 sec	0.200
	<b>ΔHt.</b>	0.879 m	0.031 m	-0.006 m	-0.832
	<b>Ellip Dist.</b>	31.036 m	0.022 m	-0.005 m	-0.621
<a href="#">AS 44A --&gt; BP 16 (PV115)</a>	<b>Az.</b>	58°00'15"	0.592 sec	-0.002 sec	-0.006
	<b>ΔHt.</b>	-42.441 m	0.038 m	0.018 m	0.737
	<b>Ellip Dist.</b>	8029.286 m	0.024 m	0.009 m	0.825
<a href="#">AS 44A --&gt; BP 03 (PV42)</a>	<b>Az.</b>	224°04'10"	0.832 sec	0.215 sec	0.594
	<b>ΔHt.</b>	-39.821 m	0.041 m	0.016 m	0.823
	<b>Ellip Dist.</b>	5682.537 m	0.024 m	-0.002 m	-0.245
<a href="#">NWS --&gt; PI 12 (PV137)</a>	<b>Az.</b>	51°30'36"	0.449 sec	0.248 sec	0.803
	<b>ΔHt.</b>	1.894 m	0.033 m	-0.009 m	-0.370
	<b>Ellip Dist.</b>	8247.950 m	0.020 m	0.004 m	0.268
<a href="#">PI 12 --&gt; ASPA (PV151)</a>	<b>Az.</b>	238°26'23"	0.418 sec	-0.244 sec	-0.802
	<b>ΔHt.</b>	14.176 m	0.034 m	0.000 m	0.017
	<b>Ellip Dist.</b>	8613.603 m	0.020 m	-0.003 m	-0.183
<a href="#">NWS --&gt; BP 14 (PV143)</a>	<b>Az.</b>	53°59'27"	0.294 sec	0.126 sec	0.615
	<b>ΔHt.</b>	176.271 m	0.026 m	-0.015 m	-0.798
	<b>Ellip Dist.</b>	13070.850 m	0.018 m	0.000 m	0.031
<a href="#">PI 16 --&gt; ASPA (PV163)</a>	<b>Az.</b>	227°38'56"	0.387 sec	-0.230 sec	-0.797
	<b>ΔHt.</b>	-234.277 m	0.033 m	0.006 m	0.214
	<b>Ellip Dist.</b>	9746.337 m	0.019 m	-0.007 m	-0.460
<a href="#">NWS R1 --&gt; PI 04 (PV40)</a>	<b>Az.</b>	246°15'43"	0.546 sec	-0.248 sec	-0.790
	<b>ΔHt.</b>	0.698 m	0.040 m	-0.005 m	-0.208
	<b>Ellip Dist.</b>	7535.316 m	0.022 m	-0.004 m	-0.313
<a href="#">TP 07 --&gt; BP 16 (PV114)</a>	<b>Az.</b>	286°43'31"	125.010 sec	-26.217 sec	-0.591
	<b>ΔHt.</b>	-0.134 m	0.030 m	-0.006 m	-0.790

	<b>Ellip Dist.</b>	36.079 m	0.022 m	0.005 m	0.619
<a href="#">ASPA --&gt; PI 09 (PV102)</a>	<b>Az.</b>	63°15'48"	1.386 sec	-0.670 sec	-0.785
	<b>ΔHt.</b>	-17.323 m	0.029 m	-0.003 m	-0.144
	<b>Ellip Dist.</b>	2680.236 m	0.019 m	-0.009 m	-0.766
<a href="#">ASPA --&gt; PI 10 (PV103)</a>	<b>Az.</b>	56°04'07"	1.021 sec	-0.567 sec	-0.775
	<b>ΔHt.</b>	-15.898 m	0.042 m	0.002 m	0.062
	<b>Ellip Dist.</b>	3987.152 m	0.019 m	-0.005 m	-0.376
<a href="#">NWS --&gt; BP 15 (PV146)</a>	<b>Az.</b>	57°45'16"	0.369 sec	0.194 sec	0.759
	<b>ΔHt.</b>	-0.935 m	0.043 m	-0.011 m	-0.380
	<b>Ellip Dist.</b>	10578.722 m	0.019 m	0.003 m	0.220
<a href="#">NWS --&gt; PI 14 (PV141)</a>	<b>Az.</b>	56°23'38"	0.344 sec	0.172 sec	0.756
	<b>ΔHt.</b>	-0.848 m	0.037 m	-0.016 m	-0.654
	<b>Ellip Dist.</b>	12798.724 m	0.019 m	0.005 m	0.349
<a href="#">AS 44A --&gt; PI 01 (PV8)</a>	<b>Az.</b>	218°03'29"	5.282 sec	-1.011 sec	-0.326
	<b>ΔHt.</b>	23.001 m	0.031 m	0.010 m	0.755
	<b>Ellip Dist.</b>	725.767 m	0.019 m	-0.001 m	-0.085
<a href="#">BP 08 --&gt; PI 08 (PV96)</a>	<b>Az.</b>	307°33'43"	291.076 sec	-10.484 sec	-0.125
	<b>ΔHt.</b>	0.760 m	0.030 m	-0.003 m	-0.474
	<b>Ellip Dist.</b>	16.496 m	0.023 m	0.005 m	0.739
<a href="#">ASPA --&gt; BP 07 (PV82)</a>	<b>Az.</b>	238°22'02"	3.134 sec	0.889 sec	0.499
	<b>ΔHt.</b>	1.449 m	0.026 m	-0.004 m	-0.305
	<b>Ellip Dist.</b>	1189.323 m	0.018 m	0.007 m	0.726
<a href="#">NWS R1 --&gt; PI 01 (PV7)</a>	<b>Az.</b>	278°32'37"	1.166 sec	0.085 sec	0.095
	<b>ΔHt.</b>	64.399 m	0.032 m	-0.022 m	-0.717
	<b>Ellip Dist.</b>	3428.996 m	0.020 m	0.001 m	0.096
<a href="#">ASPA --&gt; PI 04 (PV45)</a>	<b>Az.</b>	238°50'44"	0.578 sec	0.104 sec	0.272
	<b>ΔHt.</b>	-15.276 m	0.040 m	-0.024 m	-0.692
	<b>Ellip Dist.</b>	7037.624 m	0.022 m	0.006 m	0.399
<a href="#">BP 04 --&gt; TP 05 (PV62)</a>	<b>Az.</b>	97°23'23"	158.109 sec	34.348 sec	0.690
	<b>ΔHt.</b>	1.137 m	0.027 m	-0.003 m	-0.518
	<b>Ellip Dist.</b>	28.946 m	0.022 m	-0.002 m	-0.352

<a href="#">AS 44A --&gt; TP 05 (PV61)</a>	<b>Az.</b>	284°34'55"	1.565 sec	0.638 sec	0.679
	<b>ΔHt.</b>	355.980 m	0.037 m	0.009 m	0.352
	<b>Ellip Dist.</b>	3329.213 m	0.025 m	-0.007 m	-0.500
<a href="#">ASPA --&gt; BP 08 (PV99)</a>	<b>Az.</b>	37°37'32"	1.830 sec	-0.755 sec	-0.664
	<b>ΔHt.</b>	-14.471 m	0.032 m	0.008 m	0.428
	<b>Ellip Dist.</b>	2181.939 m	0.020 m	-0.005 m	-0.407
<a href="#">PI 16 --&gt; AS 44A (PV155)</a>	<b>Az.</b>	236°41'13"	0.352 sec	0.047 sec	0.200
	<b>ΔHt.</b>	-208.853 m	0.032 m	-0.014 m	-0.657
	<b>Ellip Dist.</b>	11094.273 m	0.020 m	0.001 m	0.047
<a href="#">AS 44A --&gt; PI 08 (PV95)</a>	<b>Az.</b>	69°31'40"	1.407 sec	0.502 sec	0.646
	<b>ΔHt.</b>	-39.135 m	0.040 m	0.019 m	0.595
	<b>Ellip Dist.</b>	3615.759 m	0.027 m	0.009 m	0.532
<a href="#">NWS --&gt; BP 12 (PV118)</a>	<b>Az.</b>	46°20'48"	0.518 sec	0.193 sec	0.546
	<b>ΔHt.</b>	-1.273 m	0.024 m	-0.010 m	-0.628
	<b>Ellip Dist.</b>	7538.411 m	0.018 m	-0.005 m	-0.418
<a href="#">NWS_R1 --&gt; PI 07 (PV79)</a>	<b>Az.</b>	268°52'06"	2.372 sec	-0.032 sec	-0.033
	<b>ΔHt.</b>	17.055 m	0.030 m	-0.009 m	-0.624
	<b>Ellip Dist.</b>	1883.452 m	0.022 m	0.002 m	0.196
<a href="#">BP 07 --&gt; PI 07 (PV78)</a>	<b>Az.</b>	167°10'17"	202.512 sec	-11.892 sec	-0.157
	<b>ΔHt.</b>	-0.367 m	0.026 m	0.005 m	0.621
	<b>Ellip Dist.</b>	21.664 m	0.021 m	0.000 m	-0.040
<a href="#">NWS --&gt; PI 16 (PV156)</a>	<b>Az.</b>	41°18'35"	0.404 sec	0.169 sec	0.610
	<b>ΔHt.</b>	250.348 m	0.032 m	-0.012 m	-0.587
	<b>Ellip Dist.</b>	9573.226 m	0.020 m	0.004 m	0.329
<a href="#">PI 06 --&gt; NWS_R1 (PV50)</a>	<b>Az.</b>	111°54'32"	1.265 sec	-0.245 sec	-0.313
	<b>ΔHt.</b>	-40.195 m	0.023 m	0.009 m	0.605
	<b>Ellip Dist.</b>	3065.549 m	0.019 m	-0.001 m	-0.112
<a href="#">NWS_R1 --&gt; TP 04 (PV33)</a>	<b>Az.</b>	226°21'30"	1.349 sec	-0.064 sec	-0.079
	<b>ΔHt.</b>	14.611 m	0.031 m	-0.010 m	-0.591
	<b>Ellip Dist.</b>	2928.273 m	0.020 m	0.003 m	0.240
<a href="#">BP 14 --&gt; AS 44A (PV142)</a>	<b>Az.</b>	244°01'12"	0.258 sec	-0.041 sec	-0.237



	<b>ΔHt.</b>	-134.776 m	0.026 m	-0.011 m	-0.587
	<b>Ellip Dist.</b>	15043.993 m	0.019 m	0.004 m	0.280
<a href="#">ASPA --&gt; BP 12 (PV123)</a>	<b>Az.</b>	54°10'24"	0.489 sec	-0.178 sec	-0.502
	<b>ΔHt.</b>	-17.344 m	0.025 m	0.007 m	0.435
	<b>Ellip Dist.</b>	7818.715 m	0.017 m	-0.007 m	-0.585
<a href="#">ASPA --&gt; TP 04 (PV46)</a>	<b>Az.</b>	205°19'27"	1.338 sec	-0.130 sec	-0.155
	<b>ΔHt.</b>	-1.362 m	0.031 m	0.010 m	0.582
	<b>Ellip Dist.</b>	2908.077 m	0.019 m	0.002 m	0.175
<a href="#">NWS R1 --&gt; TP 01 (PV17)</a>	<b>Az.</b>	281°56'58"	0.528 sec	-0.086 sec	-0.245
	<b>ΔHt.</b>	43.231 m	0.043 m	-0.005 m	-0.182
	<b>Ellip Dist.</b>	12347.902 m	0.033 m	-0.014 m	-0.582
<a href="#">NWS --&gt; BP 17 (PV158)</a>	<b>Az.</b>	31°36'08"	0.375 sec	0.134 sec	0.575
	<b>ΔHt.</b>	89.413 m	0.046 m	-0.001 m	-0.049
	<b>Ellip Dist.</b>	10817.390 m	0.025 m	0.001 m	0.037
<a href="#">PI 14 --&gt; ASPA (PV149)</a>	<b>Az.</b>	240°45'25"	0.328 sec	-0.128 sec	-0.559
	<b>ΔHt.</b>	16.918 m	0.037 m	-0.011 m	-0.446
	<b>Ellip Dist.</b>	13227.517 m	0.019 m	0.001 m	0.071
<a href="#">BP 05 --&gt; PI 05 (PV57)</a>	<b>Az.</b>	340°30'20"	134.244 sec	-27.249 sec	-0.555
	<b>ΔHt.</b>	1.293 m	0.029 m	-0.002 m	-0.225
	<b>Ellip Dist.</b>	33.191 m	0.021 m	-0.001 m	-0.134
<a href="#">PI 05 --&gt; AS 44A (PV59)</a>	<b>Az.</b>	77°00'30"	3.197 sec	0.275 sec	0.206
	<b>ΔHt.</b>	-109.391 m	0.035 m	-0.004 m	-0.219
	<b>Ellip Dist.</b>	1381.588 m	0.022 m	-0.005 m	-0.530
<a href="#">ASPA --&gt; BP 05 (PV68)</a>	<b>Az.</b>	272°12'29"	1.117 sec	-0.103 sec	-0.151
	<b>ΔHt.</b>	133.523 m	0.032 m	-0.006 m	-0.259
	<b>Ellip Dist.</b>	3405.919 m	0.019 m	0.006 m	0.516
<a href="#">PI 14 --&gt; AS 44A (PV140)</a>	<b>Az.</b>	246°14'49"	0.299 sec	0.001 sec	0.005
	<b>ΔHt.</b>	42.342 m	0.037 m	-0.009 m	-0.289
	<b>Ellip Dist.</b>	14869.876 m	0.020 m	-0.007 m	-0.508
<a href="#">PI 06 --&gt; BP 06 (PV52)</a>	<b>Az.</b>	303°08'04"	229.222 sec	-45.086 sec	-0.504
	<b>ΔHt.</b>	0.219 m	0.023 m	-0.003 m	-0.372

	<b>Ellip Dist.</b>	18.776 m	0.021 m	-0.001 m	-0.156
<a href="#">BP 11 --&gt; PI 11 (PV119)</a>	<b>Az.</b>	93°52'24"	140.142 sec	-24.041 sec	-0.492
	<b>ΔHt.</b>	0.110 m	0.028 m	0.001 m	0.082
	<b>Ellip Dist.</b>	32.325 m	0.022 m	-0.003 m	-0.408
<a href="#">AS 44A --&gt; PI 02 (PV10)</a>	<b>Az.</b>	242°45'12"	0.821 sec	-0.291 sec	-0.483
	<b>ΔHt.</b>	-13.098 m	0.047 m	0.017 m	0.344
	<b>Ellip Dist.</b>	4642.730 m	0.022 m	0.001 m	0.039
<a href="#">AS 44A --&gt; TP 04 (PV32)</a>	<b>Az.</b>	165°07'17"	1.259 sec	-0.210 sec	-0.199
	<b>ΔHt.</b>	-26.787 m	0.032 m	-0.011 m	-0.210
	<b>Ellip Dist.</b>	3209.577 m	0.019 m	-0.010 m	-0.476
<a href="#">AS 44A --&gt; BP 11 (PV120)</a>	<b>Az.</b>	39°44'23"	0.599 sec	0.196 sec	0.475
	<b>ΔHt.</b>	-43.697 m	0.035 m	0.000 m	-0.002
	<b>Ellip Dist.</b>	6903.983 m	0.021 m	0.005 m	0.340
<a href="#">NWS --&gt; PI 15 (PV160)</a>	<b>Az.</b>	24°54'31"	0.568 sec	0.468 sec	0.422
	<b>ΔHt.</b>	-1.278 m	0.052 m	0.002 m	0.012
	<b>Ellip Dist.</b>	10548.256 m	0.027 m	-0.030 m	-0.467
<a href="#">PI 13 --&gt; AS 44A (PV138)</a>	<b>Az.</b>	248°20'17"	0.338 sec	-0.080 sec	-0.467
	<b>ΔHt.</b>	42.828 m	0.057 m	-0.008 m	-0.228
	<b>Ellip Dist.</b>	13159.515 m	0.026 m	0.001 m	0.038
<a href="#">NWS --&gt; PI 11 (PV113)</a>	<b>Az.</b>	13°06'33"	0.722 sec	0.145 sec	0.459
	<b>ΔHt.</b>	-2.092 m	0.037 m	-0.001 m	-0.084
	<b>Ellip Dist.</b>	6578.790 m	0.024 m	-0.004 m	-0.382
<a href="#">NWS --&gt; PI 13 (PV139)</a>	<b>Az.</b>	57°18'58"	0.405 sec	0.084 sec	0.443
	<b>ΔHt.</b>	-1.333 m	0.057 m	-0.006 m	-0.230
	<b>Ellip Dist.</b>	11024.288 m	0.026 m	-0.002 m	-0.133
<a href="#">BP 06 --&gt; AS 44A (PV54)</a>	<b>Az.</b>	228°56'13"	39.285 sec	-4.421 sec	-0.280
	<b>ΔHt.</b>	0.985 m	0.023 m	-0.003 m	-0.356
	<b>Ellip Dist.</b>	110.886 m	0.021 m	0.004 m	0.443
<a href="#">NWS --&gt; PI 10 (PV87)</a>	<b>Az.</b>	40°20'44"	1.085 sec	0.067 sec	0.097
	<b>ΔHt.</b>	0.172 m	0.042 m	-0.009 m	-0.405
	<b>Ellip Dist.</b>	3742.922 m	0.019 m	0.006 m	0.435

<a href="#">ASPA --&gt; TP 08 (PV178)</a>	<b>Az.</b>	68°01'04"	0.255 sec	-0.052 sec	-0.285
	<b>ΔHt.</b>	12.669 m	0.039 m	0.001 m	0.051
	<b>Ellip Dist.</b>	13560.290 m	0.019 m	-0.006 m	-0.434
<a href="#">TP 03 --&gt; BP 02 (PV36)</a>	<b>Az.</b>	75°00'43"	432.641 sec	-49.298 sec	-0.378
	<b>ΔHt.</b>	-0.155 m	0.030 m	0.002 m	0.431
	<b>Ellip Dist.</b>	10.833 m	0.023 m	0.000 m	0.061
<a href="#">TP 02 --&gt; NWS R1 (PV19)</a>	<b>Az.</b>	88°20'49"	0.510 sec	-0.084 sec	-0.226
	<b>ΔHt.</b>	-0.046 m	0.030 m	-0.008 m	-0.413
	<b>Ellip Dist.</b>	8339.495 m	0.019 m	-0.003 m	-0.255
<a href="#">BP 14 --&gt; ASPA (PV148)</a>	<b>Az.</b>	238°20'42"	0.279 sec	-0.081 sec	-0.403
	<b>ΔHt.</b>	-160.201 m	0.027 m	-0.004 m	-0.210
	<b>Ellip Dist.</b>	13457.381 m	0.018 m	-0.005 m	-0.394
<a href="#">ASPA --&gt; PI 15 (PV161)</a>	<b>Az.</b>	30°47'37"	0.572 sec	-0.090 sec	-0.346
	<b>ΔHt.</b>	-17.348 m	0.051 m	0.005 m	0.222
	<b>Ellip Dist.</b>	10407.154 m	0.026 m	0.005 m	0.395
<a href="#">BP 15 --&gt; AS 44A (PV145)</a>	<b>Az.</b>	249°04'50"	0.304 sec	-0.082 sec	-0.393
	<b>ΔHt.</b>	42.429 m	0.043 m	-0.005 m	-0.151
	<b>Ellip Dist.</b>	12738.468 m	0.019 m	0.000 m	0.004
<a href="#">ASPA --&gt; PI 01 (PV12)</a>	<b>Az.</b>	267°45'51"	1.502 sec	0.000 sec	0.000
	<b>ΔHt.</b>	48.425 m	0.031 m	-0.007 m	-0.251
	<b>Ellip Dist.</b>	2517.566 m	0.020 m	0.006 m	0.390
<a href="#">NWS R1 --&gt; BP 02 (PV35)</a>	<b>Az.</b>	247°14'07"	1.072 sec	-0.114 sec	-0.285
	<b>ΔHt.</b>	87.159 m	0.044 m	-0.007 m	-0.387
	<b>Ellip Dist.</b>	4792.173 m	0.025 m	0.001 m	0.133
<a href="#">TP 02 --&gt; AS 44A (PV18)</a>	<b>Az.</b>	76°13'16"	0.742 sec	0.080 sec	0.135
	<b>ΔHt.</b>	41.352 m	0.030 m	0.011 m	0.382
	<b>Ellip Dist.</b>	5552.572 m	0.019 m	0.001 m	0.048
<a href="#">PI 12 --&gt; AS 44A (PV136)</a>	<b>Az.</b>	246°46'58"	0.364 sec	0.018 sec	0.073
	<b>ΔHt.</b>	39.601 m	0.033 m	-0.009 m	-0.376
	<b>Ellip Dist.</b>	10237.033 m	0.021 m	-0.002 m	-0.158
<a href="#">AS 44A --&gt; TP 03 (PV37)</a>	<b>Az.</b>	206°49'54"	1.557 sec	0.097 sec	0.167

	<b>ΔHt.</b>	45.917 m	0.045 m	0.008 m	0.376
	<b>Ellip Dist.</b>	3292.352 m	0.025 m	-0.002 m	-0.230
<a href="#">ASPA --&gt; BP 04 (PV65)</a>	<b>Az.</b>	283°53'08"	0.732 sec	-0.155 sec	-0.364
	<b>ΔHt.</b>	380.267 m	0.031 m	-0.005 m	-0.249
	<b>Ellip Dist.</b>	5479.160 m	0.020 m	0.001 m	0.120
<a href="#">BP 15 --&gt; ASPA (PV147)</a>	<b>Az.</b>	242°56'40"	0.343 sec	-0.089 sec	-0.363
	<b>ΔHt.</b>	17.005 m	0.044 m	-0.008 m	-0.250
	<b>Ellip Dist.</b>	11038.279 m	0.018 m	-0.004 m	-0.308
<a href="#">ASPA --&gt; NWS R1 (PV13)</a>	<b>Az.</b>	124°46'29"	1.774 sec	0.725 sec	0.288
	<b>ΔHt.</b>	-15.973 m	0.013 m	-0.005 m	-0.348
	<b>Ellip Dist.</b>	1065.588 m	0.009 m	-0.003 m	-0.207
<a href="#">ASPA --&gt; TP 02 (PV27)</a>	<b>Az.</b>	263°29'39"	0.546 sec	0.061 sec	0.180
	<b>ΔHt.</b>	-15.928 m	0.030 m	-0.002 m	-0.101
	<b>Ellip Dist.</b>	7509.033 m	0.019 m	0.004 m	0.331
<a href="#">BP 13 --&gt; AS 44A (PV130)</a>	<b>Az.</b>	249°25'41"	0.349 sec	-0.014 sec	-0.061
	<b>ΔHt.</b>	39.134 m	0.044 m	-0.011 m	-0.330
	<b>Ellip Dist.</b>	10372.172 m	0.021 m	0.000 m	-0.020
<a href="#">ASPA --&gt; PI 02 (PV11)</a>	<b>Az.</b>	255°03'54"	0.588 sec	0.129 sec	0.321
	<b>ΔHt.</b>	12.326 m	0.047 m	-0.005 m	-0.156
	<b>Ellip Dist.</b>	6412.321 m	0.021 m	0.004 m	0.242
<a href="#">TP 06 --&gt; NWS R1 (PV74)</a>	<b>Az.</b>	165°04'03"	2.031 sec	-0.336 sec	-0.249
	<b>ΔHt.</b>	-5.082 m	0.038 m	-0.004 m	-0.132
	<b>Ellip Dist.</b>	2012.778 m	0.018 m	0.002 m	0.201
<a href="#">BP 04 --&gt; NWS R1 (PV63)</a>	<b>Az.</b>	107°15'22"	0.630 sec	-0.088 sec	-0.242
	<b>ΔHt.</b>	-396.241 m	0.031 m	0.005 m	0.236
	<b>Ellip Dist.</b>	6485.848 m	0.020 m	0.002 m	0.205
<a href="#">ASPA --&gt; PI 06 (PV70)</a>	<b>Az.</b>	285°13'29"	1.854 sec	-0.173 sec	-0.157
	<b>ΔHt.</b>	24.221 m	0.022 m	0.003 m	0.223
	<b>Ellip Dist.</b>	2040.584 m	0.018 m	0.001 m	0.113
<a href="#">ASPA --&gt; NWS R1 (PV108)</a>	<b>Az.</b>	124°46'29"	1.774 sec	0.513 sec	0.215
	<b>ΔHt.</b>	-15.973 m	0.013 m	0.000 m	0.027

	<b>Ellip Dist.</b>	1065.588 m	0.009 m	-0.002 m	-0.132
<a href="#">NWS R1 --&gt; PI 02 (PV9)</a>	<b>Az.</b>	261°35'33"	0.546 sec	0.058 sec	0.165
	<b>ΔHt.</b>	28.300 m	0.047 m	-0.005 m	-0.187
	<b>Ellip Dist.</b>	7147.759 m	0.022 m	-0.001 m	-0.039
<a href="#">NWS R1 --&gt; PI 03 (PV24)</a>	<b>Az.</b>	273°15'56"	0.326 sec	0.033 sec	0.180
	<b>ΔHt.</b>	-0.431 m	0.046 m	-0.001 m	-0.030
	<b>Ellip Dist.</b>	12614.877 m	0.022 m	0.000 m	0.015
<a href="#">PI 15 --&gt; AS 44A (PV159)</a>	<b>Az.</b>	221°07'38"	0.539 sec	0.004 sec	0.010
	<b>ΔHt.</b>	42.773 m	0.052 m	-0.007 m	-0.160
	<b>Ellip Dist.</b>	11242.229 m	0.026 m	0.001 m	0.062
<a href="#">PI 03 --&gt; BP 01 (PV22)</a>	<b>Az.</b>	124°55'08"	95.529 sec	-1.354 sec	-0.048
	<b>ΔHt.</b>	0.326 m	0.036 m	-0.001 m	-0.112
	<b>Ellip Dist.</b>	50.355 m	0.023 m	-0.001 m	-0.149
<a href="#">BP 05 --&gt; NWS R1 (PV55)</a>	<b>Az.</b>	99°48'24"	0.901 sec	-0.076 sec	-0.141
	<b>ΔHt.</b>	-149.496 m	0.033 m	-0.001 m	-0.033
	<b>Ellip Dist.</b>	4342.012 m	0.020 m	-0.001 m	-0.122
<a href="#">AS 44A --&gt; BP 01 (PV20)</a>	<b>Az.</b>	267°40'33"	0.539 sec	-0.027 sec	-0.092
	<b>ΔHt.</b>	-41.503 m	0.055 m	0.005 m	0.095
	<b>Ellip Dist.</b>	9617.443 m	0.028 m	-0.001 m	-0.067
<a href="#">ASPA --&gt; PI 03 (PV25)</a>	<b>Az.</b>	270°32'38"	0.347 sec	-0.014 sec	-0.062
	<b>ΔHt.</b>	-16.404 m	0.046 m	-0.003 m	-0.073
	<b>Ellip Dist.</b>	11719.621 m	0.022 m	0.001 m	0.080

## Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
<a href="#">AS 44A</a>	<a href="#">BP 01</a>	<b>Az.</b>	267°40'33"	0.854 sec	1 : 234646	1 : 234700
		<b>ΔHt.</b>	-41.507 m	0.055 m		
		<b>ΔElev.</b>	-41.212 m	0.055 m		
		<b>Ellip Dist.</b>	9617.462 m	0.041 m		
<a href="#">AS 44A</a>	<a href="#">BP 03</a>	<b>Az.</b>	224°04'10"	1.052 sec	1 : 192168	1 : 192233

		<b>ΔHt.</b>	-39.822 m	0.041 m		
		<b>ΔElev.</b>	-39.585 m	0.041 m		
		<b>Ellip Dist.</b>	5682.549 m	0.030 m		
<a href="#">AS 44A</a>	<a href="#">BP 06</a>	<b>Az.</b>	48°56'14"	39.367 sec	1 : 5288	1 : 5290
		<b>ΔHt.</b>	-0.984 m	0.023 m		
		<b>ΔElev.</b>	-0.986 m	0.023 m		
		<b>Ellip Dist.</b>	110.886 m	0.021 m		
<a href="#">AS 44A</a>	<a href="#">BP 07</a>	<b>Az.</b>	136°06'22"	2.501 sec	1 : 84313	1 : 84643
		<b>ΔHt.</b>	-23.975 m	0.027 m		
		<b>ΔElev.</b>	-23.928 m	0.027 m		
		<b>Ellip Dist.</b>	1522.488 m	0.018 m		
<a href="#">AS 44A</a>	<a href="#">BP 11</a>	<b>Az.</b>	39°44'23"	0.812 sec	1 : 248140	1 : 247928
		<b>ΔHt.</b>	-43.696 m	0.035 m		
		<b>ΔElev.</b>	-43.652 m	0.035 m		
		<b>Ellip Dist.</b>	6903.997 m	0.028 m		
<a href="#">AS 44A</a>	<a href="#">BP 12</a>	<b>Az.</b>	63°59'26"	0.666 sec	1 : 320570	1 : 320610
		<b>ΔHt.</b>	-42.766 m	0.024 m		
		<b>ΔElev.</b>	-42.768 m	0.024 m		
		<b>Ellip Dist.</b>	9355.520 m	0.029 m		
<a href="#">AS 44A</a>	<a href="#">BP 13</a>	<b>Az.</b>	69°27'01"	0.625 sec	1 : 316679	1 : 316272
		<b>ΔHt.</b>	-39.131 m	0.044 m		
		<b>ΔElev.</b>	-39.084 m	0.044 m		
		<b>Ellip Dist.</b>	10372.192 m	0.033 m		
<a href="#">AS 44A</a>	<a href="#">BP 14</a>	<b>Az.</b>	64°03'04"	0.608 sec	1 : 346274	1 : 346113
		<b>ΔHt.</b>	134.780 m	0.026 m		
		<b>ΔElev.</b>	134.972 m	0.026 m		
		<b>Ellip Dist.</b>	15044.023 m	0.043 m		
<a href="#">AS 44A</a>	<a href="#">BP 15</a>	<b>Az.</b>	69°06'28"	0.615 sec	1 : 339119	1 : 339232
		<b>ΔHt.</b>	-42.426 m	0.043 m		
		<b>ΔElev.</b>	-42.305 m	0.043 m		
		<b>Ellip Dist.</b>	12738.494 m	0.038 m		
<a href="#">AS 44A</a>	<a href="#">BP 16</a>	<b>Az.</b>	58°00'15"	0.806 sec	1 : 255510	1 : 255558
		<b>ΔHt.</b>	-42.439 m	0.038 m		
		<b>ΔElev.</b>	-42.479 m	0.038 m		
		<b>Ellip Dist.</b>	8029.302 m	0.031 m		

<a href="#">AS 44A</a>	<a href="#">BP 17</a>	<b>Az.</b>	46°44'52"	0.647 sec	1 : 295145	1 : 295319
		<b>ΔHt.</b>	47.920 m	0.046 m		
		<b>ΔElev.</b>	48.150 m	0.046 m		
		<b>Ellip Dist.</b>	11838.811 m	0.040 m		
<a href="#">AS 44A</a>	<a href="#">NWS</a>	<b>Az.</b>	110°26'18"	0.000 sec	1 : 0	1 : 0
		<b>ΔHt.</b>	-41.494 m	0.000 m		
		<b>ΔElev.</b>	-41.426 m	0.000 m		
		<b>Ellip Dist.</b>	3151.506 m	0.000 m		
<a href="#">AS 44A</a>	<a href="#">PI 01</a>	<b>Az.</b>	218°03'29"	5.366 sec	1 : 36885	1 : 37082
		<b>ΔHt.</b>	23.001 m	0.031 m		
		<b>ΔElev.</b>	23.023 m	0.031 m		
		<b>Ellip Dist.</b>	725.768 m	0.020 m		
<a href="#">AS 44A</a>	<a href="#">PI 02</a>	<b>Az.</b>	242°45'12"	1.092 sec	1 : 172816	1 : 173049
		<b>ΔHt.</b>	-13.099 m	0.047 m		
		<b>ΔElev.</b>	-12.929 m	0.047 m		
		<b>Ellip Dist.</b>	4642.740 m	0.027 m		
<a href="#">AS 44A</a>	<a href="#">PI 05</a>	<b>Az.</b>	257°00'19"	3.324 sec	1 : 59759	1 : 59443
		<b>ΔHt.</b>	109.391 m	0.035 m		
		<b>ΔElev.</b>	109.412 m	0.035 m		
		<b>Ellip Dist.</b>	1381.590 m	0.023 m		
<a href="#">AS 44A</a>	<a href="#">PI 08</a>	<b>Az.</b>	69°31'40"	1.462 sec	1 : 130422	1 : 130770
		<b>ΔHt.</b>	-39.134 m	0.040 m		
		<b>ΔElev.</b>	-39.117 m	0.040 m		
		<b>Ellip Dist.</b>	3615.766 m	0.028 m		
<a href="#">AS 44A</a>	<a href="#">PI 09</a>	<b>Az.</b>	80°40'54"	0.929 sec	1 : 216568	1 : 216650
		<b>ΔHt.</b>	-42.746 m	0.029 m		
		<b>ΔElev.</b>	-42.696 m	0.029 m		
		<b>Ellip Dist.</b>	4521.707 m	0.021 m		
<a href="#">AS 44A</a>	<a href="#">PI 10</a>	<b>Az.</b>	71°57'09"	0.863 sec	1 : 256409	1 : 256302
		<b>ΔHt.</b>	-41.321 m	0.042 m		
		<b>ΔElev.</b>	-41.318 m	0.042 m		
		<b>Ellip Dist.</b>	5654.835 m	0.022 m		
<a href="#">AS 44A</a>	<a href="#">PI 12</a>	<b>Az.</b>	66°48'16"	0.636 sec	1 : 314470	1 : 314685
		<b>ΔHt.</b>	-39.598 m	0.033 m		
		<b>ΔElev.</b>	-39.565 m	0.033 m		

		<b>Ellip Dist.</b>	10237.054 m	0.033 m		
<a href="#">AS 44A</a>	<a href="#">PI 13</a>	<b>Az.</b>	68°21'58"	0.642 sec	1 : 306750	1 : 306412
		<b>ΔHt.</b>	-42.825 m	0.057 m		
		<b>ΔElev.</b>	-42.695 m	0.057 m		
		<b>Ellip Dist.</b>	13159.541 m	0.043 m		
<a href="#">AS 44A</a>	<a href="#">PI 14</a>	<b>Az.</b>	66°16'41"	0.620 sec	1 : 341992	1 : 342060
		<b>ΔHt.</b>	-42.339 m	0.037 m		
		<b>ΔElev.</b>	-42.162 m	0.037 m		
		<b>Ellip Dist.</b>	14869.905 m	0.043 m		
<a href="#">AS 44A</a>	<a href="#">PI 15</a>	<b>Az.</b>	41°08'39"	0.778 sec	1 : 278971	1 : 278983
		<b>ΔHt.</b>	-42.771 m	0.052 m		
		<b>ΔElev.</b>	-42.495 m	0.052 m		
		<b>Ellip Dist.</b>	11242.252 m	0.040 m		
<a href="#">AS 44A</a>	<a href="#">PI 16</a>	<b>Az.</b>	56°42'29"	0.646 sec	1 : 319839	1 : 319385
		<b>ΔHt.</b>	208.856 m	0.032 m		
		<b>ΔElev.</b>	208.941 m	0.032 m		
		<b>Ellip Dist.</b>	11094.296 m	0.035 m		
<a href="#">AS 44A</a>	<a href="#">PI 19</a>	<b>Az.</b>	72°59'56"	0.662 sec	1 : 326539	1 : 326546
		<b>ΔHt.</b>	-43.054 m	0.057 m		
		<b>ΔElev.</b>	-42.660 m	0.057 m		
		<b>Ellip Dist.</b>	19028.030 m	0.058 m		
<a href="#">AS 44A</a>	<a href="#">TP 01</a>	<b>Az.</b>	279°10'54"	0.986 sec	1 : 210310	1 : 210370
		<b>ΔHt.</b>	1.830 m	0.043 m		
		<b>ΔElev.</b>	2.163 m	0.043 m		
		<b>Ellip Dist.</b>	9255.145 m	0.044 m		
<a href="#">AS 44A</a>	<a href="#">TP 02</a>	<b>Az.</b>	256°12'32"	1.035 sec	1 : 205908	1 : 205853
		<b>ΔHt.</b>	-41.354 m	0.030 m		
		<b>ΔElev.</b>	-41.173 m	0.030 m		
		<b>Ellip Dist.</b>	5552.583 m	0.027 m		
<a href="#">AS 44A</a>	<a href="#">TP 03</a>	<b>Az.</b>	206°49'55"	1.677 sec	1 : 121026	1 : 120630
		<b>ΔHt.</b>	45.916 m	0.045 m		
		<b>ΔElev.</b>	46.045 m	0.045 m		
		<b>Ellip Dist.</b>	3292.358 m	0.027 m		
<a href="#">AS 44A</a>	<a href="#">TP 04</a>	<b>Az.</b>	165°07'17"	1.336 sec	1 : 156019	1 : 156262
		<b>ΔHt.</b>	-26.786 m	0.032 m		



		<b>ΔElev.</b>	-26.632 m	0.032 m		
		<b>Ellip Dist.</b>	3209.583 m	0.021 m		
<a href="#">AS 44A</a>	<a href="#">TP 05</a>	<b>Az.</b>	284°34'55"	1.751 sec	1 : 120957	1 : 123297
		<b>ΔHt.</b>	355.979 m	0.037 m		
		<b>ΔElev.</b>	356.068 m	0.037 m		
		<b>Ellip Dist.</b>	3329.220 m	0.028 m		
<a href="#">AS 44A</a>	<a href="#">TP 06</a>	<b>Az.</b>	70°23'55"	1.424 sec	1 : 131095	1 : 130094
		<b>ΔHt.</b>	-36.315 m	0.038 m		
		<b>ΔElev.</b>	-36.303 m	0.038 m		
		<b>Ellip Dist.</b>	2574.196 m	0.020 m		
<a href="#">AS 44A</a>	<a href="#">TP 08</a>	<b>Az.</b>	72°33'20"	0.593 sec	1 : 347812	1 : 347774
		<b>ΔHt.</b>	-12.751 m	0.038 m		
		<b>ΔElev.</b>	-12.555 m	0.038 m		
		<b>Ellip Dist.</b>	15349.100 m	0.044 m		
<a href="#">ASP A</a>	<a href="#">BP 04</a>	<b>Az.</b>	283°53'08"	0.911 sec	1 : 224592	1 : 228217
		<b>ΔHt.</b>	380.266 m	0.031 m		
		<b>ΔElev.</b>	380.328 m	0.031 m		
		<b>Ellip Dist.</b>	5479.171 m	0.024 m		
<a href="#">ASP A</a>	<a href="#">BP 05</a>	<b>Az.</b>	272°12'29"	1.220 sec	1 : 164260	1 : 163636
		<b>ΔHt.</b>	133.522 m	0.032 m		
		<b>ΔElev.</b>	133.515 m	0.032 m		
		<b>Ellip Dist.</b>	3405.926 m	0.021 m		
<a href="#">ASP A</a>	<a href="#">BP 07</a>	<b>Az.</b>	238°22'02"	3.149 sec	1 : 64765	1 : 64762
		<b>ΔHt.</b>	1.449 m	0.026 m		
		<b>ΔElev.</b>	1.468 m	0.026 m		
		<b>Ellip Dist.</b>	1189.326 m	0.018 m		
<a href="#">ASP A</a>	<a href="#">BP 08</a>	<b>Az.</b>	37°37'32"	1.941 sec	1 : 105572	1 : 105735
		<b>ΔHt.</b>	-14.471 m	0.032 m		
		<b>ΔElev.</b>	-14.481 m	0.032 m		
		<b>Ellip Dist.</b>	2181.943 m	0.021 m		
<a href="#">ASP A</a>	<a href="#">BP 11</a>	<b>Az.</b>	22°04'27"	0.899 sec	1 : 224601	1 : 224512
		<b>ΔHt.</b>	-18.273 m	0.035 m		
		<b>ΔElev.</b>	-18.257 m	0.035 m		
		<b>Ellip Dist.</b>	6239.919 m	0.028 m		
<a href="#">ASP A</a>	<a href="#">BP 12</a>	<b>Az.</b>	54°10'25"	0.796 sec	1 : 267361	1 : 267375

		<b>ΔHt.</b>	-17.342 m	0.025 m		
		<b>ΔElev.</b>	-17.372 m	0.025 m		
		<b>Ellip Dist.</b>	7818.730 m	0.029 m		
<a href="#">ASPA</a>	<a href="#">BP 13</a>	<b>Az.</b>	61°42'15"	0.745 sec	1 : 264503	1 : 264366
		<b>ΔHt.</b>	-13.707 m	0.045 m		
		<b>ΔElev.</b>	-13.689 m	0.045 m		
		<b>Ellip Dist.</b>	8680.851 m	0.033 m		
<a href="#">ASPA</a>	<a href="#">BP 14</a>	<b>Az.</b>	58°22'17"	0.678 sec	1 : 309030	1 : 308832
		<b>ΔHt.</b>	160.204 m	0.027 m		
		<b>ΔElev.</b>	160.368 m	0.027 m		
		<b>Ellip Dist.</b>	13457.408 m	0.044 m		
<a href="#">ASPA</a>	<a href="#">BP 15</a>	<b>Az.</b>	62°58'01"	0.710 sec	1 : 293907	1 : 293950
		<b>ΔHt.</b>	-17.002 m	0.044 m		
		<b>ΔElev.</b>	-16.910 m	0.044 m		
		<b>Ellip Dist.</b>	11038.301 m	0.038 m		
<a href="#">ASPA</a>	<a href="#">BP 17</a>	<b>Az.</b>	37°21'16"	0.712 sec	1 : 270158	1 : 270380
		<b>ΔHt.</b>	73.344 m	0.047 m		
		<b>ΔElev.</b>	73.546 m	0.047 m		
		<b>Ellip Dist.</b>	10801.516 m	0.040 m		
<a href="#">ASPA</a>	<a href="#">BP 19</a>	<b>Az.</b>	69°28'50"	0.675 sec	1 : 317986	1 : 317975
		<b>ΔHt.</b>	-17.931 m	0.050 m		
		<b>ΔElev.</b>	-17.564 m	0.050 m		
		<b>Ellip Dist.</b>	17243.820 m	0.054 m		
<a href="#">ASPA</a>	<a href="#">NWS</a>	<b>Az.</b>	125°19'05"	0.000 sec	1 : 0	1 : 6189854
		<b>ΔHt.</b>	-16.070 m	0.012 m		
		<b>ΔElev.</b>	-16.030 m	0.012 m		
		<b>Ellip Dist.</b>	1084.509 m	0.000 m		
<a href="#">ASPA</a>	<a href="#">PI 03</a>	<b>Az.</b>	270°32'38"	0.670 sec	1 : 302236	1 : 302242
		<b>ΔHt.</b>	-16.408 m	0.046 m		
		<b>ΔElev.</b>	-16.141 m	0.046 m		
		<b>Ellip Dist.</b>	11719.645 m	0.039 m		
<a href="#">ASPA</a>	<a href="#">PI 04</a>	<b>Az.</b>	238°50'44"	0.805 sec	1 : 245532	1 : 245537
		<b>ΔHt.</b>	-15.277 m	0.040 m		
		<b>ΔElev.</b>	-15.067 m	0.040 m		
		<b>Ellip Dist.</b>	7037.638 m	0.029 m		

<a href="#">ASPA</a>	<a href="#">PI 06</a>	<b>Az.</b>	285°13'29"	1.898 sec	1 : 109562	1 : 109689
		<b>ΔHt.</b>	24.220 m	0.022 m		
		<b>ΔElev.</b>	24.191 m	0.022 m		
		<b>Ellip Dist.</b>	2040.588 m	0.019 m		
<a href="#">ASPA</a>	<a href="#">PI 09</a>	<b>Az.</b>	63°15'48"	1.560 sec	1 : 127801	1 : 127846
		<b>ΔHt.</b>	-17.322 m	0.029 m		
		<b>ΔElev.</b>	-17.301 m	0.029 m		
		<b>Ellip Dist.</b>	2680.242 m	0.021 m		
<a href="#">ASPA</a>	<a href="#">PI 10</a>	<b>Az.</b>	56°04'07"	1.211 sec	1 : 178568	1 : 178396
		<b>ΔHt.</b>	-15.897 m	0.042 m		
		<b>ΔElev.</b>	-15.922 m	0.042 m		
		<b>Ellip Dist.</b>	3987.160 m	0.022 m		
<a href="#">ASPA</a>	<a href="#">PI 12</a>	<b>Az.</b>	58°27'24"	0.753 sec	1 : 263828	1 : 263903
		<b>ΔHt.</b>	-14.174 m	0.034 m		
		<b>ΔElev.</b>	-14.169 m	0.034 m		
		<b>Ellip Dist.</b>	8613.621 m	0.033 m		
<a href="#">ASPA</a>	<a href="#">PI 14</a>	<b>Az.</b>	60°47'00"	0.695 sec	1 : 303643	1 : 303661
		<b>ΔHt.</b>	-16.915 m	0.037 m		
		<b>ΔElev.</b>	-16.766 m	0.037 m		
		<b>Ellip Dist.</b>	13227.543 m	0.044 m		
<a href="#">ASPA</a>	<a href="#">PI 15</a>	<b>Az.</b>	30°47'37"	0.833 sec	1 : 255831	1 : 255790
		<b>ΔHt.</b>	-17.348 m	0.051 m		
		<b>ΔElev.</b>	-17.099 m	0.051 m		
		<b>Ellip Dist.</b>	10407.174 m	0.041 m		
<a href="#">ASPA</a>	<a href="#">PI 16</a>	<b>Az.</b>	47°39'56"	0.732 sec	1 : 279769	1 : 279266
		<b>ΔHt.</b>	234.279 m	0.033 m		
		<b>ΔElev.</b>	234.337 m	0.033 m		
		<b>Ellip Dist.</b>	9746.356 m	0.035 m		
<a href="#">ASPA</a>	<a href="#">TP 01</a>	<b>Az.</b>	279°52'08"	0.799 sec	1 : 257575	1 : 257574
		<b>ΔHt.</b>	27.254 m	0.043 m		
		<b>ΔElev.</b>	27.559 m	0.043 m		
		<b>Ellip Dist.</b>	11373.278 m	0.044 m		
<a href="#">ASPA</a>	<a href="#">TP 02</a>	<b>Az.</b>	263°29'39"	0.770 sec	1 : 280125	1 : 280086
		<b>ΔHt.</b>	-15.930 m	0.030 m		
		<b>ΔElev.</b>	-15.777 m	0.030 m		

		<b>Ellip Dist.</b>	7509.048 m	0.027 m		
<a href="#">ASPA</a>	<a href="#">TP 04</a>	<b>Az.</b>	205°19'27"	1.456 sec	1 : 139581	1 : 139589
		<b>ΔHt.</b>	-1.362 m	0.031 m		
		<b>ΔElev.</b>	-1.236 m	0.031 m		
		<b>Ellip Dist.</b>	2908.083 m	0.021 m		
<a href="#">ASPA</a>	<a href="#">TP 06</a>	<b>Az.</b>	14°56'08"	2.840 sec	1 : 75216	1 : 74946
		<b>ΔHt.</b>	-10.891 m	0.038 m		
		<b>ΔElev.</b>	-10.907 m	0.038 m		
		<b>Ellip Dist.</b>	1383.810 m	0.018 m		
<a href="#">ASPA</a>	<a href="#">TP 07</a>	<b>Az.</b>	45°20'52"	0.842 sec	1 : 240533	1 : 240595
		<b>ΔHt.</b>	-16.882 m	0.033 m		
		<b>ΔElev.</b>	-16.949 m	0.033 m		
		<b>Ellip Dist.</b>	6712.891 m	0.028 m		
<a href="#">ASPA</a>	<a href="#">TP 08</a>	<b>Az.</b>	68°01'04"	0.670 sec	1 : 306717	1 : 306734
		<b>ΔHt.</b>	12.672 m	0.039 m		
		<b>ΔElev.</b>	12.840 m	0.039 m		
		<b>Ellip Dist.</b>	13560.317 m	0.044 m		
<a href="#">BP 01</a>	<a href="#">PI 03</a>	<b>Az.</b>	304°55'07"	95.888 sec	1 : 2187	1 : 2189
		<b>ΔHt.</b>	-0.326 m	0.036 m		
		<b>ΔElev.</b>	-0.324 m	0.036 m		
		<b>Ellip Dist.</b>	50.355 m	0.023 m		
<a href="#">BP 02</a>	<a href="#">TP 03</a>	<b>Az.</b>	255°00'43"	434.823 sec	1 : 476	1 : 476
		<b>ΔHt.</b>	0.155 m	0.030 m		
		<b>ΔElev.</b>	0.156 m	0.030 m		
		<b>Ellip Dist.</b>	10.833 m	0.023 m		
<a href="#">BP 05</a>	<a href="#">PI 05</a>	<b>Az.</b>	340°30'20"	134.201 sec	1 : 1577	1 : 1575
		<b>ΔHt.</b>	1.293 m	0.029 m		
		<b>ΔElev.</b>	1.293 m	0.029 m		
		<b>Ellip Dist.</b>	33.191 m	0.021 m		
<a href="#">BP 07</a>	<a href="#">PI 07</a>	<b>Az.</b>	167°10'17"	202.410 sec	1 : 1020	1 : 1022
		<b>ΔHt.</b>	-0.367 m	0.026 m		
		<b>ΔElev.</b>	-0.366 m	0.026 m		
		<b>Ellip Dist.</b>	21.664 m	0.021 m		
<a href="#">NWS</a>	<a href="#">BP 08</a>	<b>Az.</b>	10°44'56"	1.812 sec	1 : 119065	1 : 119069
		<b>ΔHt.</b>	1.599 m	0.031 m		

		<b>ΔElev.</b>	1.549 m	0.031 m		
		<b>Ellip Dist.</b>	2397.180 m	0.020 m		
<a href="#">NWS</a>	<a href="#">BP 09</a>	<b>Az.</b>	39°44'46"	2.033 sec	1 : 99973	1 : 99975
		<b>ΔHt.</b>	-1.319 m	0.032 m		
		<b>ΔElev.</b>	-1.336 m	0.032 m		
		<b>Ellip Dist.</b>	2346.456 m	0.023 m		
<a href="#">NWS</a>	<a href="#">BP 12</a>	<b>Az.</b>	46°20'48"	0.823 sec	1 : 257018	1 : 257011
		<b>ΔHt.</b>	-1.272 m	0.024 m		
		<b>ΔElev.</b>	-1.342 m	0.024 m		
		<b>Ellip Dist.</b>	7538.426 m	0.029 m		
<a href="#">NWS</a>	<a href="#">BP 13</a>	<b>Az.</b>	54°56'40"	0.783 sec	1 : 251450	1 : 251474
		<b>ΔHt.</b>	2.363 m	0.044 m		
		<b>ΔElev.</b>	2.342 m	0.044 m		
		<b>Ellip Dist.</b>	8256.234 m	0.033 m		
<a href="#">NWS</a>	<a href="#">BP 14</a>	<b>Az.</b>	53°59'27"	0.697 sec	1 : 299551	1 : 299370
		<b>ΔHt.</b>	176.274 m	0.026 m		
		<b>ΔElev.</b>	176.398 m	0.026 m		
		<b>Ellip Dist.</b>	13070.876 m	0.044 m		
<a href="#">NWS</a>	<a href="#">BP 15</a>	<b>Az.</b>	57°45'16"	0.741 sec	1 : 281653	1 : 281655
		<b>ΔHt.</b>	-0.932 m	0.043 m		
		<b>ΔElev.</b>	-0.879 m	0.043 m		
		<b>Ellip Dist.</b>	10578.743 m	0.038 m		
<a href="#">NWS</a>	<a href="#">BP 17</a>	<b>Az.</b>	31°36'08"	0.714 sec	1 : 271579	1 : 271833
		<b>ΔHt.</b>	89.414 m	0.046 m		
		<b>ΔElev.</b>	89.576 m	0.046 m		
		<b>Ellip Dist.</b>	10817.411 m	0.040 m		
<a href="#">NWS</a>	<a href="#">BP 19</a>	<b>Az.</b>	66°23'26"	0.697 sec	1 : 306540	1 : 306524
		<b>ΔHt.</b>	-1.861 m	0.049 m		
		<b>ΔElev.</b>	-1.534 m	0.049 m		
		<b>Ellip Dist.</b>	16659.011 m	0.054 m		
<a href="#">NWS</a>	<a href="#">PI 10</a>	<b>Az.</b>	40°20'45"	1.267 sec	1 : 164473	1 : 164461
		<b>ΔHt.</b>	0.173 m	0.042 m		
		<b>ΔElev.</b>	0.108 m	0.042 m		
		<b>Ellip Dist.</b>	3742.929 m	0.023 m		
<a href="#">NWS</a>	<a href="#">PI 11</a>	<b>Az.</b>	13°06'33"	0.926 sec	1 : 217790	1 : 217787

		<b>ΔHt.</b>	-2.092 m	0.037 m		
		<b>ΔElev.</b>	-2.117 m	0.037 m		
		<b>Ellip Dist.</b>	6578.803 m	0.030 m		
<a href="#">NWS</a>	<a href="#">PI 12</a>	<b>Az.</b>	51°30'36"	0.786 sec	1 : 252307	1 : 252296
		<b>ΔHt.</b>	1.896 m	0.033 m		
		<b>ΔElev.</b>	1.861 m	0.033 m		
		<b>Ellip Dist.</b>	8247.967 m	0.033 m		
<a href="#">NWS</a>	<a href="#">PI 13</a>	<b>Az.</b>	57°18'58"	0.765 sec	1 : 256327	1 : 256316
		<b>ΔHt.</b>	-1.331 m	0.057 m		
		<b>ΔElev.</b>	-1.269 m	0.057 m		
		<b>Ellip Dist.</b>	11024.310 m	0.043 m		
<a href="#">NWS</a>	<a href="#">PI 14</a>	<b>Az.</b>	56°23'38"	0.717 sec	1 : 293265	1 : 293257
		<b>ΔHt.</b>	-0.845 m	0.037 m		
		<b>ΔElev.</b>	-0.736 m	0.037 m		
		<b>Ellip Dist.</b>	12798.750 m	0.044 m		
<a href="#">NWS</a>	<a href="#">PI 15</a>	<b>Az.</b>	24°54'31"	0.817 sec	1 : 257670	1 : 257647
		<b>ΔHt.</b>	-1.278 m	0.052 m		
		<b>ΔElev.</b>	-1.069 m	0.052 m		
		<b>Ellip Dist.</b>	10548.277 m	0.041 m		
<a href="#">NWS</a>	<a href="#">PI 16</a>	<b>Az.</b>	41°18'35"	0.743 sec	1 : 274025	1 : 273611
		<b>ΔHt.</b>	250.349 m	0.032 m		
		<b>ΔElev.</b>	250.367 m	0.032 m		
		<b>Ellip Dist.</b>	9573.246 m	0.035 m		
<a href="#">NWS</a>	<a href="#">TP 07</a>	<b>Az.</b>	36°02'58"	0.855 sec	1 : 236880	1 : 236884
		<b>ΔHt.</b>	-0.811 m	0.032 m		
		<b>ΔElev.</b>	-0.919 m	0.032 m		
		<b>Ellip Dist.</b>	6610.841 m	0.028 m		
<a href="#">NWS</a>	<a href="#">TP 08</a>	<b>Az.</b>	63°59'32"	0.698 sec	1 : 293727	1 : 293781
		<b>ΔHt.</b>	28.742 m	0.038 m		
		<b>ΔElev.</b>	28.871 m	0.038 m		
		<b>Ellip Dist.</b>	13006.483 m	0.044 m		
<a href="#">NWS_R1</a>	<a href="#">ASPA</a>	<b>Az.</b>	304°46'22"	1.954 sec	1 : 106104	1 : 106146
		<b>ΔHt.</b>	15.973 m	0.013 m		
		<b>ΔElev.</b>	15.935 m	0.013 m		
		<b>Ellip Dist.</b>	1065.590 m	0.010 m		

<a href="#">NWS_R1</a>	<a href="#">BP 02</a>	<b>Az.</b>	247°14'07"	1.206 sec	1 : 173191	1 : 173207
		<b>ΔHt.</b>	87.158 m	0.044 m		
		<b>ΔElev.</b>	87.220 m	0.044 m		
		<b>Ellip Dist.</b>	4792.182 m	0.028 m		
<a href="#">NWS_R1</a>	<a href="#">BP 04</a>	<b>Az.</b>	287°14'31"	0.868 sec	1 : 237166	1 : 239932
		<b>ΔHt.</b>	396.239 m	0.031 m		
		<b>ΔElev.</b>	396.263 m	0.031 m		
		<b>Ellip Dist.</b>	6485.861 m	0.027 m		
<a href="#">NWS_R1</a>	<a href="#">BP 05</a>	<b>Az.</b>	279°47'49"	1.074 sec	1 : 189406	1 : 188843
		<b>ΔHt.</b>	149.495 m	0.033 m		
		<b>ΔElev.</b>	149.449 m	0.033 m		
		<b>Ellip Dist.</b>	4342.021 m	0.023 m		
<a href="#">NWS_R1</a>	<a href="#">NWS</a>	<b>Az.</b>	153°21'50"	97.423 sec	1 : 2152	1 : 2152
		<b>ΔHt.</b>	-0.097 m	0.014 m		
		<b>ΔElev.</b>	-0.096 m	0.014 m		
		<b>Ellip Dist.</b>	21.491 m	0.010 m		
<a href="#">NWS_R1</a>	<a href="#">PI 01</a>	<b>Az.</b>	278°32'37"	1.277 sec	1 : 158312	1 : 158980
		<b>ΔHt.</b>	64.398 m	0.032 m		
		<b>ΔElev.</b>	64.353 m	0.032 m		
		<b>Ellip Dist.</b>	3429.003 m	0.022 m		
<a href="#">NWS_R1</a>	<a href="#">PI 02</a>	<b>Az.</b>	261°35'33"	0.796 sec	1 : 244772	1 : 244372
		<b>ΔHt.</b>	28.298 m	0.047 m		
		<b>ΔElev.</b>	28.401 m	0.047 m		
		<b>Ellip Dist.</b>	7147.774 m	0.029 m		
<a href="#">NWS_R1</a>	<a href="#">PI 03</a>	<b>Az.</b>	273°15'56"	0.682 sec	1 : 299309	1 : 299300
		<b>ΔHt.</b>	-0.435 m	0.046 m		
		<b>ΔElev.</b>	-0.206 m	0.046 m		
		<b>Ellip Dist.</b>	12614.902 m	0.042 m		
<a href="#">NWS_R1</a>	<a href="#">PI 04</a>	<b>Az.</b>	246°15'43"	0.805 sec	1 : 246065	1 : 246063
		<b>ΔHt.</b>	0.696 m	0.040 m		
		<b>ΔElev.</b>	0.868 m	0.040 m		
		<b>Ellip Dist.</b>	7535.331 m	0.031 m		
<a href="#">NWS_R1</a>	<a href="#">PI 06</a>	<b>Az.</b>	291°54'08"	1.390 sec	1 : 148864	1 : 149027
		<b>ΔHt.</b>	40.194 m	0.023 m		
		<b>ΔElev.</b>	40.125 m	0.023 m		

		<b>Ellip Dist.</b>	3065.555 m	0.021 m		
<a href="#">NWS_R1</a>	<a href="#">PI 07</a>	<b>Az.</b>	268°52'06"	2.448 sec	1 : 84218	1 : 84308
		<b>ΔHt.</b>	17.055 m	0.030 m		
		<b>ΔElev.</b>	17.036 m	0.030 m		
		<b>Ellip Dist.</b>	1883.456 m	0.022 m		
<a href="#">NWS_R1</a>	<a href="#">TP 01</a>	<b>Az.</b>	281°56'58"	0.784 sec	1 : 257779	1 : 257741
		<b>ΔHt.</b>	43.227 m	0.043 m		
		<b>ΔElev.</b>	43.493 m	0.043 m		
		<b>Ellip Dist.</b>	12347.927 m	0.048 m		
<a href="#">NWS_R1</a>	<a href="#">TP 02</a>	<b>Az.</b>	268°19'40"	0.774 sec	1 : 278270	1 : 278258
		<b>ΔHt.</b>	0.043 m	0.030 m		
		<b>ΔElev.</b>	0.157 m	0.030 m		
		<b>Ellip Dist.</b>	8339.512 m	0.030 m		
<a href="#">NWS_R1</a>	<a href="#">TP 04</a>	<b>Az.</b>	226°21'31"	1.475 sec	1 : 136357	1 : 136333
		<b>ΔHt.</b>	14.611 m	0.031 m		
		<b>ΔElev.</b>	14.698 m	0.031 m		
		<b>Ellip Dist.</b>	2928.279 m	0.021 m		
<a href="#">NWS_R1</a>	<a href="#">TP 06</a>	<b>Az.</b>	345°03'59"	2.102 sec	1 : 107777	1 : 107833
		<b>ΔHt.</b>	5.082 m	0.038 m		
		<b>ΔElev.</b>	5.028 m	0.038 m		
		<b>Ellip Dist.</b>	2012.782 m	0.019 m		
<a href="#">PI 01</a>	<a href="#">ASPA</a>	<b>Az.</b>	87°46'12"	1.541 sec	1 : 127493	1 : 128173
		<b>ΔHt.</b>	-48.425 m	0.031 m		
		<b>ΔElev.</b>	-48.418 m	0.031 m		
		<b>Ellip Dist.</b>	2517.572 m	0.020 m		
<a href="#">PI 02</a>	<a href="#">ASPA</a>	<b>Az.</b>	75°04'45"	0.794 sec	1 : 239631	1 : 239401
		<b>ΔHt.</b>	-12.325 m	0.047 m		
		<b>ΔElev.</b>	-12.467 m	0.047 m		
		<b>Ellip Dist.</b>	6412.334 m	0.027 m		
<a href="#">PI 04</a>	<a href="#">BP 03</a>	<b>Az.</b>	4°17'04"	147.543 sec	1 : 1426	1 : 1426
		<b>ΔHt.</b>	0.879 m	0.031 m		
		<b>ΔElev.</b>	0.878 m	0.031 m		
		<b>Ellip Dist.</b>	31.036 m	0.022 m		
<a href="#">PI 06</a>	<a href="#">BP 06</a>	<b>Az.</b>	303°08'04"	230.003 sec	1 : 898	1 : 898
		<b>ΔHt.</b>	0.219 m	0.023 m		



		<b>ΔElev.</b>	0.219 m	0.023 m		
		<b>Ellip Dist.</b>	18.776 m	0.021 m		
<a href="#">PI 08</a>	<a href="#">BP 08</a>	<b>Az.</b>	127°33'43"	291.938 sec	1 : 732	1 : 739
		<b>ΔHt.</b>	-0.760 m	0.030 m		
		<b>ΔElev.</b>	-0.760 m	0.030 m		
		<b>Ellip Dist.</b>	16.496 m	0.023 m		
<a href="#">PI 09</a>	<a href="#">BP 09</a>	<b>Az.</b>	196°20'28"	146.853 sec	1 : 1409	1 : 1409
		<b>ΔHt.</b>	-0.066 m	0.026 m		
		<b>ΔElev.</b>	-0.065 m	0.026 m		
		<b>Ellip Dist.</b>	29.890 m	0.021 m		
<a href="#">PI 11</a>	<a href="#">BP 11</a>	<b>Az.</b>	273°52'24"	140.873 sec	1 : 1475	1 : 1476
		<b>ΔHt.</b>	-0.110 m	0.028 m		
		<b>ΔElev.</b>	-0.109 m	0.028 m		
		<b>Ellip Dist.</b>	32.325 m	0.022 m		
<a href="#">PI 19</a>	<a href="#">BP 19</a>	<b>Az.</b>	74°37'36"	235.440 sec	1 : 930	1 : 930
		<b>ΔHt.</b>	-0.301 m	0.035 m		
		<b>ΔElev.</b>	-0.300 m	0.035 m		
		<b>Ellip Dist.</b>	22.822 m	0.025 m		
<a href="#">TP 05</a>	<a href="#">BP 04</a>	<b>Az.</b>	277°23'23"	159.002 sec	1 : 1294	1 : 1290
		<b>ΔHt.</b>	-1.137 m	0.027 m		
		<b>ΔElev.</b>	-1.136 m	0.027 m		
		<b>Ellip Dist.</b>	28.946 m	0.022 m		
<a href="#">TP 07</a>	<a href="#">BP 16</a>	<b>Az.</b>	286°43'31"	125.566 sec	1 : 1635	1 : 1635
		<b>ΔHt.</b>	-0.134 m	0.030 m		
		<b>ΔElev.</b>	-0.134 m	0.030 m		
		<b>Ellip Dist.</b>	36.079 m	0.022 m		

Date: 10/31/2012 11:30:56 AM	Project: C:\TBC\7505-068_AMSAM\7505-068.vce	Trimble Business Center
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# V. Point Photos

TP -001





TP-002

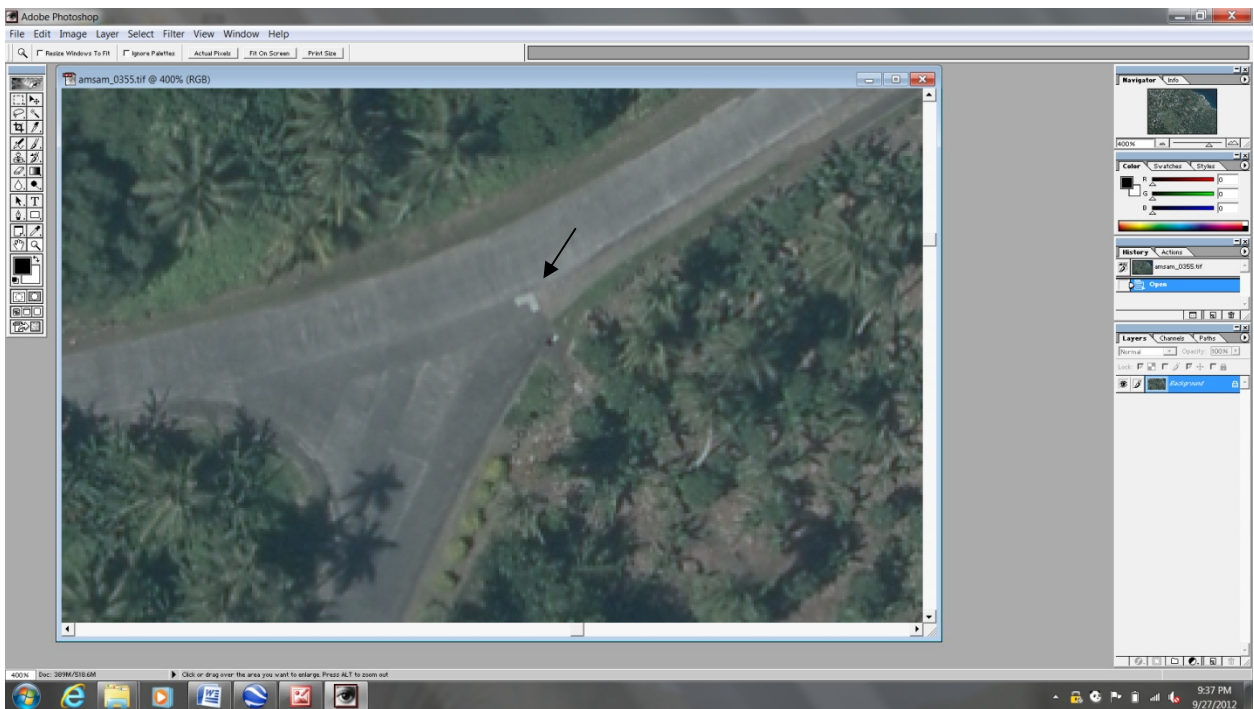


TP-003





TP-004



TP-005





TP-006





TP-007





TP-008





PI-001

Google Earth is placing in wrong position





PI-002





PI-003



PI-004



PI-005



Only point I am not confident in the exact point.



PI-006

Google earth not matching up to point





PI-007

Google earth not matching up to point



PI-008





PI-009



PI-010





PI-011



PI-012





PI-013



PI-014





PI-015



# PI-016



# VI. NGS Data Sheets

# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.3
1      National Geodetic Survey,   Retrieval Date = JUNE 19, 2012
AJ5871 *****
AJ5871 HT_MOD      -   This is a Height Modernization Survey Station.
AJ5871 CORS       -   This is a GPS Continuously Operating Reference Station.
AJ5871 DESIGNATION - AMERICAN SAMOA CORS ARP
AJ5871 CORS_ID    -   ASPA
AJ5871 PID        -   AJ5871
AJ5871 STATE/COUNTY- AS/
AJ5871 COUNTRY    -   US
AJ5871 USGS QUAD   -   TUTUILA ISLAND (1989)
AJ5871
AJ5871                      *CURRENT SURVEY CONTROL
AJ5871
AJ5871* NAD 83(CORS) POSITION- 14 19 33.98175(S) 170 43 20.66544(W)  ADJUSTED
AJ5871* NAD 83(CORS) ELLIP HT-   53.139 (meters)           (12/??/09)  ADJUSTED
AJ5871* NAD 83(CORS) EPOCH   -   2002.00
AJ5871* ASVD02 ORTHO HEIGHT -   19.87 (meters)           65.2 (feet) GPS OBS
AJ5871
AJ5871 ASVD02 orthometric height was determined with geoid model      EGM96
AJ5871 GEOID HEIGHT   -           31.18 (meters)                      EGM96
AJ5871 GEOID HEIGHT   -           33.41 (meters)                      GEOID09
AJ5871 NAD 83(CORS) X  -  -6,100,258.840 (meters)                    COMP
AJ5871 NAD 83(CORS) Y  -  -996,506.206 (meters)                    COMP
AJ5871 NAD 83(CORS) Z  -  -1,567,978.829 (meters)                    COMP
AJ5871 HORZ ORDER     -   SPECIAL (CORS)
AJ5871 ELLP ORDER     -   SPECIAL (CORS)
AJ5871
AJ5871.The coordinates were established by GPS observations
AJ5871.and adjusted by the National Geodetic Survey in December 2009.
AJ5871
AJ5871.The datum tag of NAD 83(CORS) is equivalent to NAD 83(PACP00).
AJ5871
AJ5871.The coordinates are valid at the epoch date displayed above
AJ5871.which is a decimal equivalence of Year/Month/Day.
AJ5871
AJ5871.The orthometric height was determined by GPS observations and a
AJ5871.high-resolution geoid model using precise GPS observation and
AJ5871.processing techniques.
AJ5871
AJ5871.The PID for the CORS L1 Phase Center is DK7460.
AJ5871
AJ5871.The XYZ, and position/ellipsoidal ht. are equivalent.
AJ5871
AJ5871.The ellipsoidal height was determined by GPS observations
AJ5871.and is referenced to NAD 83.
AJ5871
AJ5871
AJ5871                      SUPERSEDED SURVEY CONTROL
AJ5871
AJ5871 NAD 83(CORS)- 14 19 33.98444(S)   170 43 20.66917(W) AD(2002.00) c

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AJ5871 ELLIP H (06/??/07) 53.219 (m) GP(2002.00) c c  
AJ5871 NAD 83(CORS)- 14 19 33.98495(S) 170 43 20.67014(W) AD(2002.00) c  
AJ5871 ELLIP H (10/??/02) 53.254 (m) GP(2002.00) c c  
AJ5871 NAD 83(CORS)- 14 19 33.97589(S) 170 43 20.66853(W) AD(1997.00) c  
AJ5871 ELLIP H (11/??/01) 53.716 (m) GP(1997.00) c c  
AJ5871 NAD 83(CORS)- 14 19 33.97589(S) 170 43 20.66853(W) AD(1993.62) c  
AJ5871 ELLIP H (11/??/01) 53.716 (m) GP(1993.62) c c

AJ5871

AJ5871.Superseded values are not recommended for survey control.

AJ5871.NGS no longer adjusts projects to the AS datum.

AJ5871.[See file dsdata.txt](#) to determine how the superseded data were derived.

AJ5871

AJ5871\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LNK2993416189(NAD 83)

AJ5871

AJ5871\_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

AJ5871

AJ5871 STATION DESCRIPTION

AJ5871

AJ5871'DESCRIBED BY NATIONAL GEODETIC SURVEY 2009

AJ5871'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND

AJ5871'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE

AJ5871'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.

AJ5871' ftp://cors.ngs.noaa.gov/cors/README.txt

AJ5871' ftp://cors.ngs.noaa.gov/cors/coord/coord\_08

AJ5871' ftp://cors.ngs.noaa.gov/cors/station\_log

AJ5871' http://geodesy.noaa.gov/CORS

\*\*\* retrieval complete.

Elapsed Time = 00:00:02



# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

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DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.3
1      National Geodetic Survey,   Retrieval Date = JUNE 11, 2012
DE8754 *****
DE8754 DESIGNATION -   ASCC AS 44 A
DE8754 PID          -   DE8754
DE8754 STATE/COUNTY- AS/EASTERN (DISTRICT)
DE8754 COUNTRY      -   US
DE8754 USGS QUAD    -   TUTUILA ISLAND (1989)
DE8754
DE8754                      *CURRENT SURVEY CONTROL
DE8754
DE8754* NAD 83(2002) POSITION- 14 19 18.58307(S) 170 44 29.68820(W)   ADJUSTED
DE8754* NAD 83(2002) ELLIP HT-    78.698 (meters)                (02/05/03)   ADJUSTED
DE8754* NAD 83(2002) EPOCH   -   2002.00
DE8754* ASVD02 ORTHO HEIGHT -    45.249 (meters)                148.45 (feet) ADJUSTED
DE8754
DE8754 NAD 83(2002) X   -  -6,100,731.966 (meters)                COMP
DE8754 NAD 83(2002) Y   -  -994,487.632 (meters)                COMP
DE8754 NAD 83(2002) Z   -  -1,567,526.598 (meters)                COMP
DE8754 LAPLACE CORR     -    -0.30 (seconds)                    DEFLEC09
DE8754 GEOID HEIGHT     -    33.44 (meters)                    GEOID09
DE8754 HORZ ORDER       -   A
DE8754 VERT ORDER        -   FIRST      CLASS II
DE8754 ELLP ORDER        -   THIRD      CLASS I
DE8754
DE8754.The horizontal coordinates were established by GPS observations
DE8754.and adjusted by the National Geodetic Survey in February 2003.
DE8754
DE8754.The horizontal coordinates are valid at the epoch date displayed above
DE8754.which is a decimal equivalence of Year/Month/Day.
DE8754
DE8754.The orthometric height was determined by differential leveling and
DE8754.adjusted in April 2003.
DE8754
DE8754.No vertical observational check was made to the station.
DE8754
DE8754.The X, Y, and Z were computed from the position and the ellipsoidal ht.
DE8754
DE8754.The Laplace correction was computed from DEFLEC09 derived deflections.
DE8754
DE8754.The ellipsoidal height was determined by GPS observations
DE8754.and is referenced to NAD 83.
DE8754
DE8754. The following values were computed from the NAD 83(2002) position.
DE8754
DE8754;
DE8754;UTM 02          -   North          East          Units Scale Factor Converg.
DE8754;UTM 02          -   8,416,665.024   527,867.780   MT   0.99960961   +0 03 50.1
DE8754
DE8754!
DE8754!UTM 02          -   Elev Factor x   Scale Factor =   Combined Factor
DE8754!UTM 02          -   0.99998762 x   0.99960961 =   0.99959724
DE8754

```

DE8754 SUPERSEDED SURVEY CONTROL  
DE8754  
DE8754.No superseded survey control is available for this station.  
DE8754  
DE8754\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LNK2786716665(NAD 83)  
DE8754  
DE8754\_MARKER: DV = VERTICAL CONTROL DISK  
DE8754\_SETTING: 32 = SET IN A RETAINING WALL OR CONCRETE LEDGE  
DE8754\_SP\_SET: CULVERT HEADWALL  
DE8754\_STAMPING: ASCC AS 44 A 2002  
DE8754\_MARK LOGO: NGS  
DE8754\_MAGNETIC: N = NO MAGNETIC MATERIAL  
DE8754\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
DE8754+STABILITY: SURFACE MOTION

DE8754  
DE8754 HISTORY - Date Condition Report By  
DE8754 HISTORY - 2002 MONUMENTED ASPWR

DE8754  
DE8754 STATION DESCRIPTION

DE8754'DESCRIBED BY AMERICAN SAMOA POWER AUTHORITY 2002 (TAI)  
DE8754'THE STATION IS LOCATED IN MAPUSAG VILLAGE ON TUTUIILA ISLAND OF  
DE8754'AMERICAN SAMOA. ABOUT 10.0 MILES (16.1 KM) WEST ON HWY 001 FROM THE  
DE8754'FAGASA INTERSECTION AND HWY 001. THE MARK AT THE FALE AT THE CENTER  
DE8754'OF THE CAMPUS ON THE WINGWALL. THE STATION IS LOCATED ON SOUTHWEST  
DE8754'SIDE OF THE FALE AND IS NEAR THE CENTER OF THE SOUTHWEST HEADWALL OF  
DE8754'THE BOX CULVERT. THE MARK IS A STANDARD NGS BENCH MARK DISK.

\*\*\* retrieval complete.  
Elapsed Time = 00:00:01

# The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.88.3
1      National Geodetic Survey,   Retrieval Date = JUNE 11, 2012
AA3709 *****
AA3709 DESIGNATION - SATELLITE TRIANG STATION 022
AA3709 PID - AA3709
AA3709 STATE/COUNTY- AS/EASTERN (DISTRICT)
AA3709 COUNTRY - US
AA3709 USGS QUAD - TUTUILA ISLAND (1989)
AA3709
AA3709 *CURRENT SURVEY CONTROL
AA3709
AA3709* NAD 83(2002) POSITION- 14 19 54.38461(S) 170 42 51.13897(W) ADJUSTED
AA3709* NAD 83(2002) ELLIP HT- 37.174 (meters) (02/05/03) ADJUSTED
AA3709* NAD 83(2002) EPOCH - 2002.00
AA3709* ASVD02 ORTHO HEIGHT - 3.823 (meters) 12.54 (feet) ADJUSTED
AA3709
AA3709 NAD 83(2002) X - -6,099,947.706 (meters) COMP
AA3709 NAD 83(2002) Y - -997,351.900 (meters) COMP
AA3709 NAD 83(2002) Z - -1,568,582.436 (meters) COMP
AA3709 LAPLACE CORR - 1.47 (seconds) DEFLEC09
AA3709 GEOID HEIGHT - 33.37 (meters) GEOID09
AA3709 HORZ ORDER - A
AA3709 VERT ORDER - FIRST CLASS II
AA3709 ELLP ORDER - THIRD CLASS I
AA3709
AA3709.This is a reference station for the AMERICAN SAMOA
AA3709.National Continuously Operating Reference Station (ASPA).
AA3709
AA3709.The horizontal coordinates were established by GPS observations
AA3709.and adjusted by the National Geodetic Survey in February 2003.
AA3709
AA3709.The horizontal coordinates are valid at the epoch date displayed above
AA3709.which is a decimal equivalence of Year/Month/Day.
AA3709
AA3709.The orthometric height was determined by differential leveling and
AA3709.adjusted in April 2003.
AA3709
AA3709.No vertical observational check was made to the station.
AA3709
AA3709.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AA3709
AA3709.The Laplace correction was computed from DEFLEC09 derived deflections.
AA3709
AA3709.The ellipsoidal height was determined by GPS observations
AA3709.and is referenced to NAD 83.
AA3709
AA3709. The following values were computed from the NAD 83(2002) position.
AA3709
AA3709;
AA3709;UTM 02 - 8,415,561.660 530,818.516 MT 0.99961175 +0 04 14.7
AA3709

```



AA3709! - Elev Factor x Scale Factor = Combined Factor  
 AA3709!UTM 02 - 0.99999415 x 0.99961175 = 0.99960591

AA3709  
 AA3709: Primary Azimuth Mark Grid Az  
 AA3709:UTM 02 - PPG ARP 054 24 55.6

PID	Reference Object	Distance	Geod. Az ddmmss.s
AA4462	PPG ARP	450.709 METERS	0542910.3
AJ2252	SAT TRIANG STA 022 RM 1	17.732 METERS	17445
AI9463	BETTY 13 ECC ET	203.139 METERS	30553
AI9968	TAU MTN OBSTRUCTION LIGHT	APPROX. 2.6 KM	3222356.9

AA3709  
 AA3709 SUPERSEDED SURVEY CONTROL

AA3709 NAD 83(1993)- 14 19 54.37534(S) 170 42 51.13727(W) AD(1993.62) 1  
 AA3709 ELLIP H (11/30/94) 37.621 (m) GP(1993.62) 5 1  
 AA3709 ASD 62 - 14 20 12.21614(S) 170 42 46.75786(W) AD( ) 2

AA3709  
 AA3709.Superseded values are not recommended for survey control.  
 AA3709.NGS no longer adjusts projects to the AS datum.  
 AA3709.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3709  
 AA3709\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LNK3081815561(NAD 83)

AA3709  
 AA3709\_MARKER: DB = BENCH MARK DISK  
 AA3709\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT  
 AA3709\_SP\_SET: CONCRETE POST  
 AA3709\_STAMPING: SATELLITE TRIANG STATION 022 1966  
 AA3709\_MARK LOGO: CGS  
 AA3709\_PROJECTION: RECESSED 18 CENTIMETERS  
 AA3709\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 AA3709\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO  
 AA3709+STABILITY: SURFACE MOTION  
 AA3709\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 AA3709+SATELLITE: SATELLITE OBSERVATIONS - August 21, 2008

HISTORY	Date	Condition	Report By
AA3709	1966	MONUMENTED	CGS
AA3709	1968	GOOD	CGS
AA3709	19930804	GOOD	NOS
AA3709	20020822	GOOD	NGS
AA3709	20080821	GOOD	NGS

AA3709  
 AA3709 STATION DESCRIPTION

AA3709'DESCRIBED BY COAST AND GEODETIC SURVEY 1968 (CND)  
 AA3709'STATION MARK AND 3 REFERENCE MARKS WERE ALL RECOVERED AND FOUND IN  
 AA3709'GOOD CONDITION. ORIGINAL DESCRIPTION NOT AVAILABLE, SO A COMPLETE NEW  
 AA3709'DESCRIPTION IS AS FOLLOWS. STATION IS LOCATED IN THE SOUTHWEST CORNER  
 AA3709'OF THE WEATHER BUREAU STATION GROUNDS IN TAFUNA, ABOUT 0.2 MILE  
 AA3709'SOUTHWEST OF THE TAFUNA AIRPORT TERMINAL BUILDING. -PAGO PAGO  
 AA3709'INTERNATIONAL AIRPORT-. TO REACH FROM THE AIRPORT TERMINAL BUILDING,  
 AA3709'GO WESTERLY ON PAVED ROAD FOR 0.1 MILE TO A SIDE ROAD LEFT. -ENTRANCE  
 AA3709'TO WEATHER BUREAU SITE-. TURN LEFT AND GO SOUTH FOR 0.1 MILE,  
 AA3709'-PASSING TO THE RIGHT OF THE WEATHER BUREAU BUILDINGS-, TO THE STATION  
 AA3709'AS DESCRIBED. STATION IS A STANDARD DISK, SET IN THE TOP OF A 3 FOOT  
 AA3709'DIAMETER CONCRETE POST, WHICH IS 2 INCHES BELOW SURFACE OF THE GROUND.

AA3709'IT IS 52 FEET WEST OF A 6X6 FOOT CONCRETE PAD, 2.5 FEET SOUTH OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SATELLITE TRIANG. STATION 022 1966---. REFERENCE  
AA3709'MARK NO. 1 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL HOLE IN THE  
AA3709'NORTHEAST CORNER OF A 6X6 FOOT CONCRETE PAD. IT IS 57 FEET EAST OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 1 1966---. REFERENCE  
AA3709'MARK NO. 2 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL HOLE IN  
AA3709'BEDROCK. IT IS 73 FEET SOUTHWEST OF A 6X6 FOOT CONCRETE PAD, 37 FEET  
AA3709'SOUTH OF A METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN  
AA3709'POST. THE DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 2 1966---.  
AA3709'REFERENCE MARK NO. 3 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL  
AA3709'HOLE IN BEDROCK. IT IS 82 FEET NORTHWEST OF A 6X6 FOOT CONCRETE PAD,  
AA3709'68 FEET SOUTH-SOUTHEAST OF A POWER POLE, 68 FEET NORTH-NORTHWEST OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 3 1966. THERE IS NO  
AA3709'AZIMUTH MARK SET TO THIS STATION. STATION BETTY 13 ECC ET -USGS- 1962  
AA3709'CAN BE USED.

AA3709

STATION RECOVERY (1993)

AA3709

AA3709

AA3709'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (JGF)

AA3709'RECOVERED AS DESCRIBED.

AA3709

AA3709

STATION RECOVERY (2002)

AA3709

AA3709'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2002 (EEC)

AA3709'RECOVERED AS DESCRIBED.

AA3709

AA3709

STATION RECOVERY (2008)

AA3709

AA3709'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2008 (EEC)

AA3709'MARK FOUND AS DESCRIBED

\*\*\* retrieval complete.

Elapsed Time = 00:00:14

# VII. POB Mapping Services Reports

# TUTUILA AND AUNUU ISLANDS

## GROUND CONTROL POINTS SURVEY

PHOTO SCIENCE: Project #7525-055 & #7505-068

# 2012

Tutuila

AUNUU



Presented by :

POB MAPPING SERVICES

NU'UULI, PAGO PAGO

AMERICAN SAMOA 96799

PROJECT: AMERICAN SAMOA IMAGERY

TUTUILA AND AUNUU GCP COLLECTION ( PHASE-III )

LOCATION: AMERICAN SAMOA

TUTUILA AND AUNUU ISLANDS

MAIN CONTRACTOR: PHOTO SCIENCE INC.

SURVEY SUB-CONSULTANT: POB MAPPING SERVICES

### Table of Contents

- I. Survey Summary Report
- II. Equipment Specifications
- III. NGS Network Data Sheets
- IV. Final GCP's Coordinates Summary
- V. GCP's Adjustment Statistics and Report
- VI. Data Log Sheets with Photographs

I.

SEPTEMBER 17, 2012.

## Survey summary report

POB Mapping Services was contracted by Photo Science Inc on September 1, 2012 to establish and survey 23 ground control points (GCP's), to support the Aerial Topographical LIDAR data and High Resolution Aerial Imagery for the main Island of Tutuila and the Island of Aunuu in American Samoa. A total of 17 GCP's were survey inside of the Tafuna International Airport, 3 GCP's on the island of Aunuu and 3 GCP's on the northeast end of Tutuila island, one in each villages of Aoa, Alao and Tula.

Field survey was conducted from September 2<sup>nd</sup> through September 19<sup>th</sup> by POB Mapping Services survey crew. Horizontal and Vertical controls for the 23 GCP's were established by using 30 minutes Static GPS observations method and adjusted to NGS control network dated 6-27-2012. Vertical controls were calculated based on the NGS Geoid Model 2012 on the NGS website. All points were post process and check to meet its accuracies (95% confidence level) as stated in the SOW.

The 17 Ground Control Points for the Tafuna International Airport were either set with PK nails with painted targets or PK nails with fabric survey targets and existing paint stripes on the runways. The remaining 6 targets on the Northeast end of Tutuila and Aunuu were either edge of pavement, corner of concrete slab, corner of ball courts and paint stripes on court lot. Locations of each photo identifiable survey points were provided by Photo Science in the SOW.

POB Mapping Services Utilize TOPCON GR-3 GPS survey grade receivers for Static GPS data collections. Topcon Tools V.8 was the post processing software for Static GPS survey calculations. All GCP points were documented with field photos showing the GPS set-up during data collections. Attached maps show GCP's approximate location and direction where each target were pointing by referencing to true north.

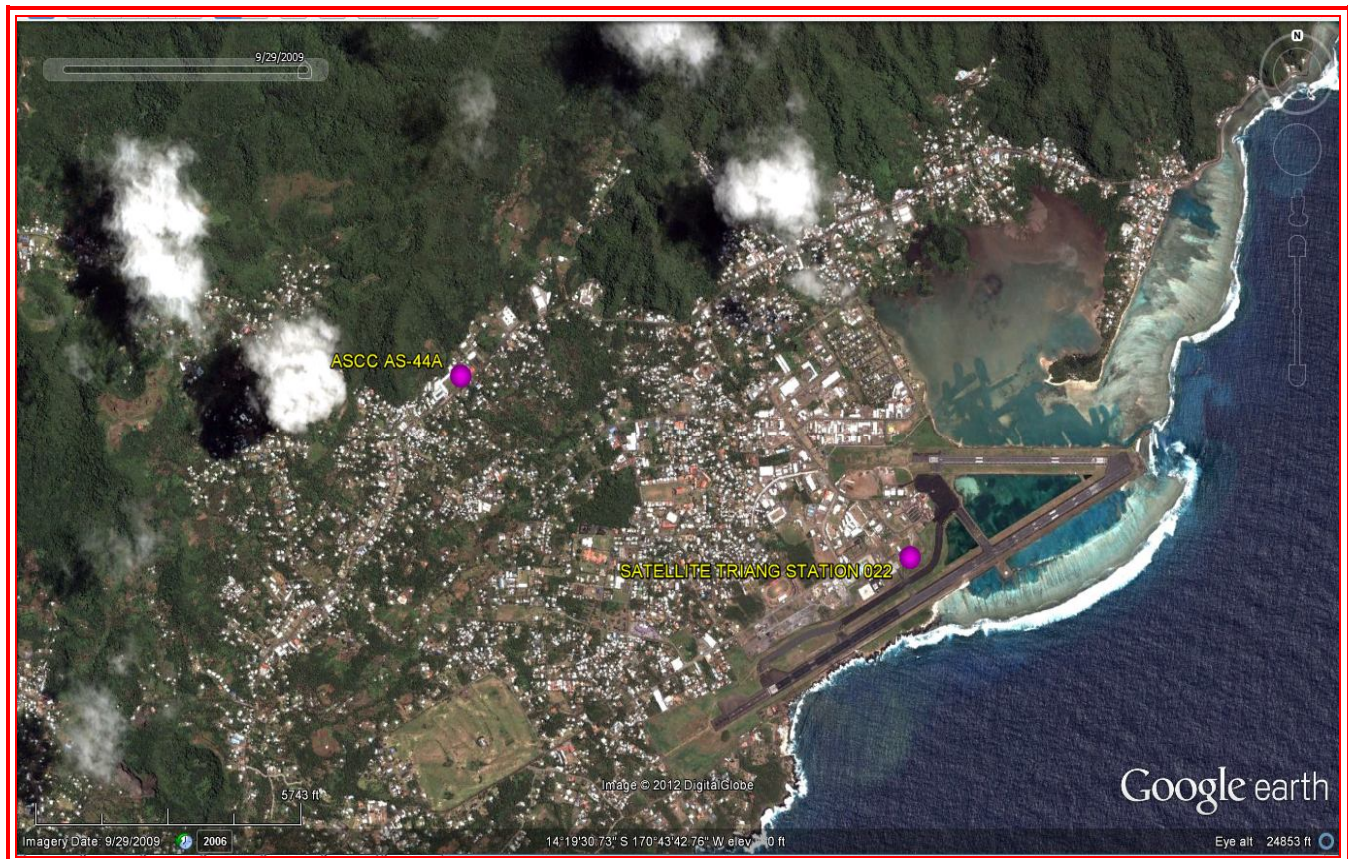


The 23 GCP's will be used for LIDAR calibration, imagery control and imagery accuracy.

Final GCP's are deliver in Universal Transverse Mercator (UTM), Zone\_2 South Projection with Horizontal Datum ( NAD83 ) as stated in the SOW. The main Horizontal and Vertical Control Points were "Satellite Triang Station 022" and "ASCC AS-44A". All elevations were based on NGS Geoid Model 2012.

### Main Control Points

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Description
SATELLITE TRIANG STA 022	14°19'54.38513"S	170°42'51.13845"W	8,415,561.644	530,818.532	3.823	USGS DISK
ASCC AS-44A	14°19'18.58372"S	170°44'29.68767"W	8,416,665.004	5,278,67.796	45.249	NGS BENCH MARK DISK



MAP SHOW MAIN CONTROL POINTS FOR PHASE-III GCP'S SURVEY



# II. Equipment Specifications for GPS receivers

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Your authorized Topcon dealer has the answer for all of your precise positioning needs. Whether you're looking for precision GPS+ control for surveying and engineering applications or layout and grade management on a construction job site, your local Topcon dealer offers the widest range of products to get the job done quickly and accurately.

And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an indicate-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or ag/land leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

## The Leader in Customer Satisfaction...

To ensure that your Topcon system makes peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

### Offices Worldwide

**TOPCON CORPORATION**  
751 Haverhill, Massachusetts • Tel: (978) 682-2000  
Fax: (978) 682-2020 • Fax: (978) 682-2020 • [www.topcon.us](http://www.topcon.us)

**Topcon Europe Positioning & E**  
Eastham 11, 2008 U Capelle Rd • THE NETHERLANDS  
Phone: (00) 462021 • Fax: (00) 462020 • [www.topcon.eu](http://www.topcon.eu)

**Topcon Corporation Building Office**  
Box A No. 3, Gyeonggi, Seoul, Korea  
Tel: (82) 31-8200210 • Fax: (82) 31-8200210



**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
[www.topconpositioning.com](http://www.topconpositioning.com)

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P/N: 7010-0205 Rev. A Printed in U.S.A. 03/08

### Basic Specifications

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signals Tracked:	
GPS	L1, L2, & L5 carrier, CA, L1 P, L2 P, L2C
GLONASS	L1, L2, & L5 carrier, L1CA, L2CA, L1 P, L2 P
GALILEO	E2-L1-E1, E5, E6
<b>WEASSTONES</b>	
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real-time RTK accuracy	H: 10mm+1ppm V: 15mm+1ppm
Post processed Static DGPS	H: ±3.0mm+0.5ppm V: ±4.0mm+0.5ppm
<b>COMMUNICATIONS</b>	
Optical Modem Type	Integrated TCM 915MHz Spread Spectrum
Base Radio Output	0.250 - 1.0 Watts, selectable
Cellular Communications:	Integrated via SIM Card, GSM/GPRS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update/Output Rate	1 - 20Hz, selectable
Real Time Data Output	TPS, RTCM SC104, CMR, CMR-
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External, Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium I-Beam Housing
Operating Temperature	-20 to +50C with batteries
Environmental Specification	IP66 waterproof/dustproof
Shock Rating	2 meter pole drop

### The Leader in Positioning Technology...

Topcon Positioning Systems is the worldwide leading developer and manufacturer of precision positioning equipment and offers the widest selection of innovative precision GPS systems, laser, optical surveying, and machine control products.

From open field construction projects to isolated surveying sites and from selling farmland to inner city utility projects, Topcon Positioning Systems provides innovative technology that provides a decidedly competitive edge to end-users.

The recognized innovative trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands facing construction, surveying, agriculture, utilities and law enforcement industries worldwide.

Your local Authorized Topcon dealer is:

GR-3

TOPCON



## G3 ENABLED GNSS RECEIVER



### Advanced GPS+ Technology

- G3 SATELLITE TRACKING (GPS, GLONASS, GALILEO)
- ADVANCED RUGGED SYSTEM DESIGN
- BLUETOOTH WIRELESS TECHNOLOGY
- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION

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## It's time.

Topcon is proud to be the world leader in advanced satellite positioning technology. From our leadership with dual constellation, GNSS receivers, springs the next generation of satellite positioning technology - G3.

G3 is the first technology to combine all three satellite positioning systems - GPS, GLONASS, and the European Galileo system. In addition to adding the Galileo system to Topcon's industry leading GPS+GLONASS technology, the new G3 chip technology incorporates the planned signal modernization of the GPS and GLONASS satellite systems, representing a system that is designed to track all available positioning satellite signals, available now or planned for the future!

The new G3 technology from Topcon ensures our users that a system they invest in today will still be fully operational far into the foreseeable future, eliminating the need to buy a new receiver as the new signals come on line. Only Topcon offers the Universal Tracking Technology found in the new G3 receiver system, demonstrating clear technology leadership.

Just imagine combining all the power of the new G3 tracking technology in a small, rugged field receiver. The new Topcon GR-3 receiver represents the next generation of advanced system design and tracking technology from Topcon, and truly sets new standards of performance, accuracy, and innovative receiver design.

Offering advanced design features not found in other receivers, the GR-3's modern design provides the flexibility and ease-of-use you demand. Bluetooth technology provides GR-3 users with the advantages of a completely cable-free system setup, with any Windows CE field controller, and the ultra rugged construction of the GR-3 is designed to take the punishment of any jobsite.

Topcon's GR-3 with its Universal Signal Tracking and a wide array of advanced design features is truly a revolutionary receiver for ahead of any other receiver technology available!

Welcome to the next generation of satellite positioning technology!



TOPCON  
It's time.

### The new Topcon GR-3 represents the next generation in GPS+ receiver technology.



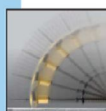
- G3 Tracking Technology**
- 72 "Universal" channels support all current and planned satellite positioning signals
  - All GPS Signals
  - All Glonass Signals
  - All Galileo Signals



- Advanced System Design**
- Hot Swappable Batteries
  - Li-ION Rechargeable or Alkaline
  - Completely Cable-Free Design
  - Convenient Quick-Snap pole mounting system



- Memory & Communication**
- Easy Access SD & SIM Cards
  - 915 MHz Spread Spectrum Radio
  - Optional Internal GSM/GPRS
  - Bluetooth Wireless Technology



- Ultra Rugged Construction**
- Durable magnesium housing
  - I-Beam construction for added strength
  - Weatherproof design
  - Withstands 20m pole drop onto concrete
  - Environmentally sealed external ports

- Combine the GR-3 with a Topcon Controller!**
- Topcon's FC Series Field Controllers
  - Full color touch screen
  - Graphical Windows interface
  - Operates the full suite of Topcon field controller software packages
  - Wireless operation via Bluetooth connection



### The GR-3 is the next generation RTK GPS system from Topcon. This exciting new system incorporates G3 tracking technology to track all three satellite positioning systems as well as new design features not found in any other system.



- Cable-Free Base & Rover Operation**
- No hassles from broken cables
  - Quick, easy setup & teardown
  - Simple to learn & use
  - All fits in one small hard sided case



- Dual Receiver Package Includes:**
- Two GR-3 Receivers
  - Charging Cables
  - PC Data Cables
  - Hard Carry Case
  - Radio Antennas
  - Manuals & Utility software
  - Field Height Tripod



### Accessories



**GMS-2 Dual-use Controller**  
Combine surveying and G3 location tasks with the optional GMS-2 controller. Navigate using the integrated GPS, then operate as an RTK controller connected to the GR-3.



**Optional Smart Charger**  
(Operates in Base or Rover modes)  
Functions:  
• Charge Batteries  
• External Power Supply  
• Integrated Tripod Hook

**Topcon Tools Office Software Suite**  
Post processing raw GPS data, verification of RTK measurements or combining satellite data with terrestrial measurements, Topcon's Topcon Tools Software Suite provides unsurpassed power and flexibility.

**Field Controller Software**  
**TopSURV**  
Topcon's professional survey Field Control Software.

**Packet 3-D**  
Topcon's Field Software, designed specifically for the contractor.

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There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

**The Leader in Customer Satisfaction...**

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

**Offices Worldwide**

**TOPCON CORPORATION**  
75-1 Hiranuma-cho, Itabashi-ku • Tokyo 174-8581 Japan  
Phone: 3-5550-2501 • Fax: 3-5561-4214 • www.topcon.com

**Topcon Europe Positioning B.V.**  
Tribaan 11, 2001 LC Capelle aan den IJpolder • The Netherlands  
Phone: 06-4585077 • Fax: 06-4585945 • www.topconpos.com

**Topcon Corporation Beijing Office**  
Block A No. 5, Kangding Street, Beijing Economic  
Technological Development Area, Beijing 100176 • CHINA  
Tel: 46-10-6385-2209 • Fax: 46-10-6792-2706



**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
www.topconpositioning.com

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**Basic Specifications**

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signals Tracked:	GPS GLONASS GALILEO
WAAS/EGNOS	Yes
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real time RTK accuracy	H: ±0.5mm-1ppm V: ±0.5mm-1ppm
Post processed Static DGPS	H: ±3.0mm+0.5ppm V: ±5.0mm+0.5ppm
<b>COMMUNICATIONS</b>	
Optional Radio Type	Integrated Tx/Rx 915MHz Spread Spectrum
Base Radio Output	0.250 - 1.0 Watts, selectable
Cellular Communications	Integrated via SIM Card, GSM/GPRS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update/Output Rate	1 - 20Hz Selectable
Real Time Data Output	TPS, RTCM SC10x, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium 1-Beam Housing
Operating Temperature	-20 to +50C with Batteries
Environmental Specification	IP66 waterproof/dustproof
Shock Rating	2 meter pole drop

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From open field construction projects to isolated surveying sites and from rolling farmland to inner city utility projects, Topcon Positioning Systems provides innovative technology that provides a decidedly competitive edge to end users.



The recognized innovative trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands facing construction, surveying, agriculture, utilities and law enforcement industries worldwide.

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**G3 ENABLED GNSS RECEIVER**



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- ADVANCED RUGGED SYSTEM DESIGN
- BLUETOOTH WIRELESS TECHNOLOGY
- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION



### III.

## NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 7.89.4
1      National Geodetic Survey, Retrieval Date = SEPTEMBER 24, 2012
DE8754 *****
DE8754 DESIGNATION - ASCC AS 44 A
DE8754 PID - DE8754
DE8754 STATE/COUNTY- AS/EASTERN (DISTRICT)
DE8754 COUNTRY - US
DE8754 USGS QUAD - TUTUILA ISLAND (1989)
DE8754
DE8754 *CURRENT SURVEY CONTROL
DE8754
DE8754* NAD 83(PA11) POSITION- 14 19 18.58372(S) 170 44 29.68767(W) ADJUSTED
DE8754* NAD 83(PA11) ELLIP HT- 78.672 (meters) (06/27/12) ADJUSTED
DE8754* NAD 83(PA11) EPOCH - 2010.00
DE8754* ASVD02 ORTHO HEIGHT - 45.249 (meters) 148.45 (feet) ADJUSTED
DE8754
DE8754 NAD 83(PA11) X - -6,100,731.934 (meters) COMP
DE8754 NAD 83(PA11) Y - -994,487.643 (meters) COMP
DE8754 NAD 83(PA11) Z - -1,567,526.611 (meters) COMP
DE8754 LAPLACE CORR - -0.30 (seconds) DEFLEC09
DE8754 GEOID HEIGHT - 33.43 (meters) GEOID12A
DE8754 VERT ORDER - FIRST CLASS II
DE8754
DE8754 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
DE8754 Type Horiz Ellip Dist(km)
DE8754 -----
DE8754 NETWORK 3.21 9.49
DE8754 -----
DE8754 MEDIAN LOCAL ACCURACY AND DIST (004 points) 0.81 9.49 2.13
DE8754 -----
DE8754 NOTE: Click here for information on individual local accuracy
DE8754 values and other accuracy information.
DE8754
DE8754
DE8754.The horizontal coordinates were established by GPS observations
DE8754.and adjusted by the National Geodetic Survey in June 2012.
DE8754
DE8754.NAD 83(PA11) refers to NAD 83 coordinates where the reference
DE8754.frame has been affixed to the stable Pacific tectonic plate.
DE8754
DE8754.The horizontal coordinates are valid at the epoch date displayed above
DE8754.which is a decimal equivalence of Year/Month/Day.
DE8754
DE8754.The orthometric height was determined by differential leveling and
DE8754.adjusted by the NATIONAL GEODETIC SURVEY
DE8754.in April 2003.
DE8754
DE8754.No vertical observational check was made to the station.
DE8754
DE8754.The X, Y, and Z were computed from the position and the ellipsoidal ht.
DE8754
DE8754.The Laplace correction was computed from DEFLEC09 derived deflections.
DE8754
DE8754.The ellipsoidal height was determined by GPS observations
DE8754.and is referenced to NAD 83.
DE8754
DE8754. The following values were computed from the NAD 83(PA11) position.
```



```

1      National Geodetic Survey,  Retrieval Date = SEPTEMBER 24, 2012
AA3709 *****
AA3709 DESIGNATION -  SATELLITE TRIANG STATION 022
AA3709 PID           -  AA3709
AA3709 STATE/COUNTY-  AS/EASTERN (DISTRICT)
AA3709 COUNTRY       -  US
AA3709 USGS QUAD     -  TUTUILA ISLAND (1989)
AA3709
AA3709                *CURRENT SURVEY CONTROL
AA3709
AA3709* NAD 83(PA11) POSITION- 14 19 54.38513(S) 170 42 51.13845(W)  ADJUSTED
AA3709* NAD 83(PA11) ELLIP HT-   37.140 (meters)                (06/27/12)  ADJUSTED
AA3709* NAD 83(PA11) EPOCH   - 2010.00
AA3709* ASVD02 ORTHO HEIGHT -   3.823 (meters)                12.54 (feet) ADJUSTED
AA3709
AA3709 NAD 83(PA11) X   - -6,099,947.667 (meters)                COMP
AA3709 NAD 83(PA11) Y   - -997,351.910 (meters)                COMP
AA3709 NAD 83(PA11) Z   - -1,568,582.443 (meters)                COMP
AA3709 LAPLACE CORR     -   1.47 (seconds)                      DEFLEC09
AA3709 GEOID HEIGHT     -   33.31 (meters)                      GEOID12A
AA3709 VERT ORDER      -  FIRST CLASS II
AA3709
AA3709 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AA3709 Type                                     Horiz  Ellip  Dist(km)
AA3709 -----
AA3709 NETWORK                                     3.22   9.56
AA3709 -----
AA3709 MEDIAN LOCAL ACCURACY AND DIST (000 points) 0.00   0.00   0.00
AA3709 -----
AA3709 NOTE: Click here for information on individual local accuracy
AA3709 values and other accuracy information.
AA3709
AA3709
AA3709.This is a reference station for the AMERICAN SAMOA
AA3709.National Continuously Operating Reference Station (ASPA).
AA3709
AA3709.The horizontal coordinates were established by GPS observations
AA3709.and adjusted by the National Geodetic Survey in June 2012.
AA3709
AA3709.NAD 83(PA11) refers to NAD 83 coordinates where the reference
AA3709.frame has been affixed to the stable Pacific tectonic plate.
AA3709
AA3709.The horizontal coordinates are valid at the epoch date displayed above
AA3709.which is a decimal equivalence of Year/Month/Day.
AA3709
AA3709.The orthometric height was determined by differential leveling and
AA3709.adjusted by the NATIONAL GEODETIC SURVEY
AA3709.in April 2003.
AA3709
AA3709.No vertical observational check was made to the station.
AA3709
AA3709.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AA3709
AA3709.The Laplace correction was computed from DEFLEC09 derived deflections.
AA3709
AA3709.The ellipsoidal height was determined by GPS observations
AA3709.and is referenced to NAD 83.
AA3709
AA3709. The following values were computed from the NAD 83(PA11) position.
AA3709
AA3709;                               North           East           Units Scale Factor Converg.
AA3709;UTM 02           - 8,415,561.644   530,818.532   MT  0.99961175  +0 04 14.7
AA3709

```



AA3709! - Elev Factor x Scale Factor = Combined Factor  
 AA3709!UTM 02 - 0.99999416 x 0.99961175 = 0.99960591  
 AA3709  
 AA3709: Primary Azimuth Mark Grid Az  
 AA3709:UTM 02 - PPG ARP 054 24 58.5  
 AA3709

PID	Reference Object	Distance	Geod. Az ddmmss.s
AA4462	PPG ARP	450.710 METERS	0542913.2
AJ2252	SAT TRIANG STA 022 RM 1	17.732 METERS	17445
AI9463	BETTY 13 ECC ET	203.161 METERS	30553
AI9968	TAU MTN OBSTRUCTION LIGHT	APPROX. 2.6 KM	3222356.7

AA3709 SUPERSEDED SURVEY CONTROL

AA3709 NAD 83(2002)- 14 19 54.38461(S) 170 42 51.13897(W) AD(2002.00) A  
 AA3709 ELLIP H (02/05/03) 37.174 (m) GP(2002.00) 3 1  
 AA3709 NAD 83(1993)- 14 19 54.37534(S) 170 42 51.13727(W) AD(1993.62) 1  
 AA3709 ELLIP H (11/30/94) 37.621 (m) GP(1993.62) 5 1  
 AA3709 ASD 62 - 14 20 12.21614(S) 170 42 46.75786(W) AD( ) 2  
 AA3709

AA3709.Superseded values are not recommended for survey control.

AA3709.NGS no longer adjusts projects to the AS datum.

AA3709.[See file dsdata.txt](#) to determine how the superseded data were derived.

AA3709\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LNK3081815561(NAD 83)

AA3709\_MARKER: DB = BENCH MARK DISK

AA3709\_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AA3709\_SP\_SET: CONCRETE POST

AA3709\_STAMPING: SATELLITE TRIANG STATION 022 1966

AA3709\_MARK LOGO: CGS

AA3709\_PROJECTION: RECESSED 18 CENTIMETERS

AA3709\_MAGNETIC: N = NO MAGNETIC MATERIAL

AA3709\_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AA3709+STABILITY: SURFACE MOTION

AA3709\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AA3709+SATELLITE: SATELLITE OBSERVATIONS - August 21, 2008

HISTORY	Date	Condition	Report By
HISTORY	- 1966	MONUMENTED	CGS
HISTORY	- 1968	GOOD	CGS
HISTORY	- 19930804	GOOD	NOS
HISTORY	- 20020822	GOOD	NGS
HISTORY	- 20080821	GOOD	NGS

AA3709 STATION DESCRIPTION

AA3709'DESCRIBED BY COAST AND GEODETIC SURVEY 1968 (CND)  
 AA3709'STATION MARK AND 3 REFERENCE MARKS WERE ALL RECOVERED AND FOUND IN  
 AA3709'GOOD CONDITION. ORIGINAL DESCRIPTION NOT AVAILABLE, SO A COMPLETE NEW  
 AA3709'DESCRIPTION IS AS FOLLOWS. STATION IS LOCATED IN THE SOUTHWEST CORNER  
 AA3709'OF THE WEATHER BUREAU STATION GROUNDS IN TAFUNA, ABOUT 0.2 MILE  
 AA3709'SOUTHWEST OF THE TAFUNA AIRPORT TERMINAL BUILDING. -PAGO PAGO  
 AA3709'INTERNATIONAL AIRPORT-. TO REACH FROM THE AIRPORT TERMINAL BUILDING,  
 AA3709'GO WESTERLY ON PAVED ROAD FOR 0.1 MILE TO A SIDE ROAD LEFT. -ENTRANCE  
 AA3709'TO WEATHER BUREAU SITE-. TURN LEFT AND GO SOUTH FOR 0.1 MILE,  
 AA3709'-PASSING TO THE RIGHT OF THE WEATHER BUREAU BUILDINGS-, TO THE STATION  
 AA3709'AS DESCRIBED. STATION IS A STANDARD DISK, SET IN THE TOP OF A 3 FOOT  
 AA3709'DIAMETER CONCRETE POST, WHICH IS 2 INCHES BELOW SURFACE OF THE GROUND.

AA3709'IT IS 52 FEET WEST OF A 6X6 FOOT CONCRETE PAD, 2.5 FEET SOUTH OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SATELLITE TRIANG. STATION 022 1966---. REFERENCE  
AA3709'MARK NO. 1 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL HOLE IN THE  
AA3709'NORTHEAST CORNER OF A 6X6 FOOT CONCRETE PAD. IT IS 57 FEET EAST OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 1 1966---. REFERENCE  
AA3709'MARK NO. 2 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL HOLE IN  
AA3709'BEDROCK. IT IS 73 FEET SOUTHWEST OF A 6X6 FOOT CONCRETE PAD, 37 FEET  
AA3709'SOUTH OF A METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN  
AA3709'POST. THE DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 2 1966---.  
AA3709'REFERENCE MARK NO. 3 IS A STANDARD DISK, CEMENTED FLUSH IN A DRILL  
AA3709'HOLE IN BEDROCK. IT IS 82 FEET NORTHWEST OF A 6X6 FOOT CONCRETE PAD,  
AA3709'68 FEET SOUTH-SOUTHEAST OF A POWER POLE, 68 FEET NORTH-NORTHWEST OF A  
AA3709'METAL WITNESS SIGN, WHICH IS ATTACHED TO A 4X4 INCH WOODEN POST. THE  
AA3709'DISK IS STAMPED---SAT TRIANG STATION NO 022 NO 3 1966. THERE IS NO  
AA3709'AZIMUTH MARK SET TO THIS STATION. STATION BETTY 13 ECC ET -USGS- 1962  
AA3709'CAN BE USED.

AA3709

STATION RECOVERY (1993)

AA3709

AA3709'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (JGF)

AA3709'RECOVERED AS DESCRIBED.

AA3709

AA3709

STATION RECOVERY (2002)

AA3709

AA3709'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2002 (EEC)

AA3709'RECOVERED AS DESCRIBED.

AA3709

AA3709

STATION RECOVERY (2008)

AA3709

AA3709'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2008 (EEC)

AA3709'MARK FOUND AS DESCRIBED

\*\*\* retrieval complete.

Elapsed Time = 00:00:05

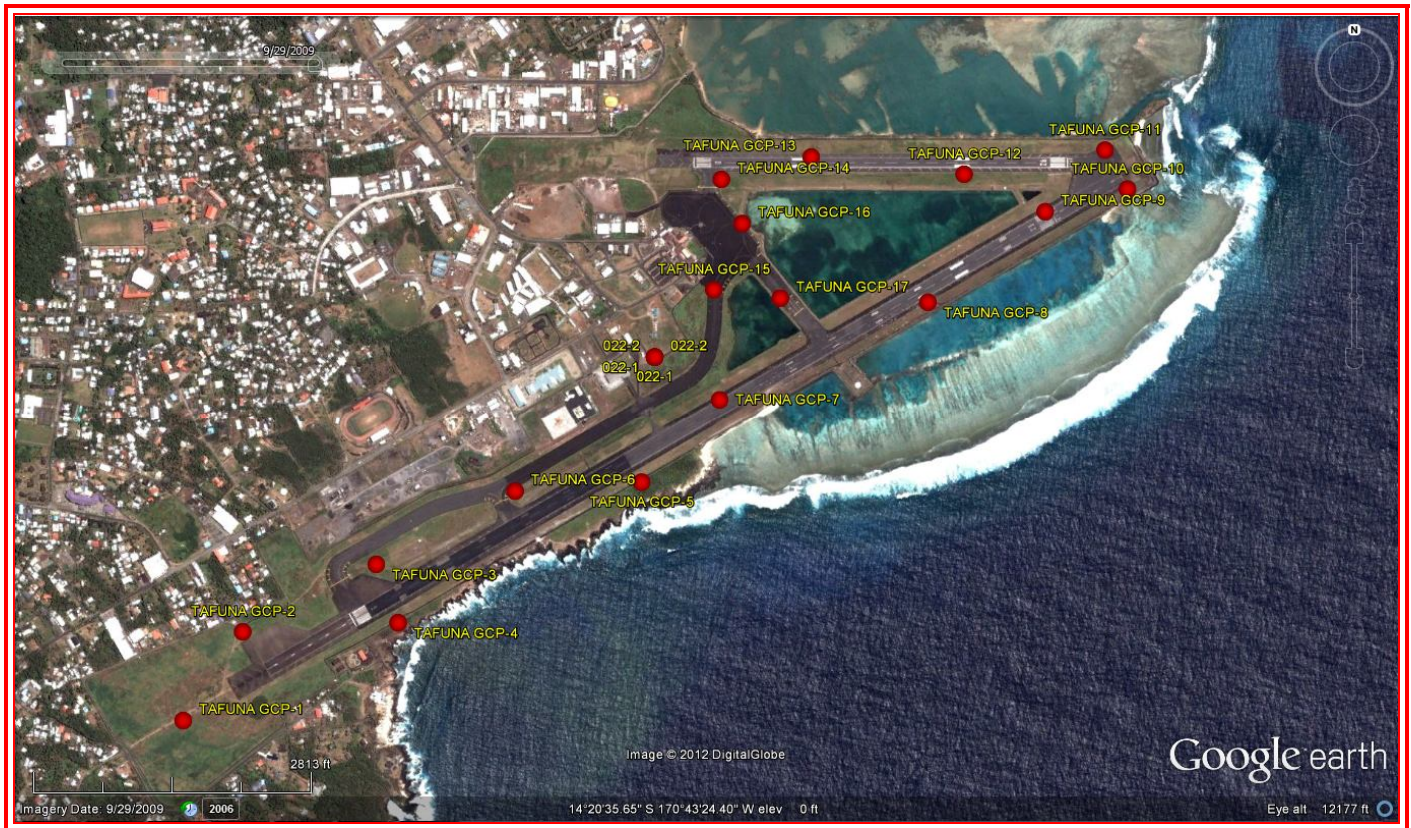


# IV.

## Final GCP's Coordinates Summary

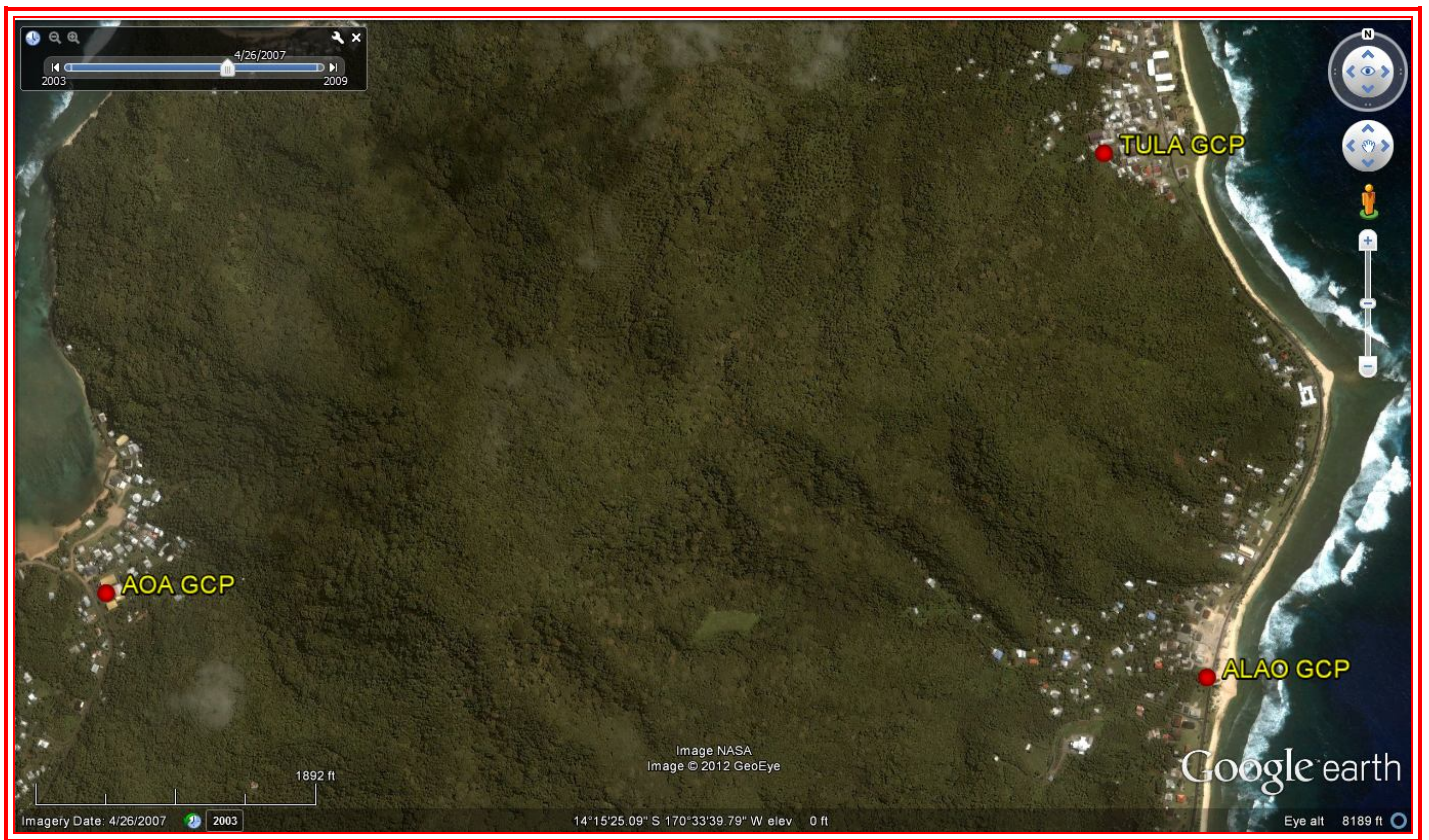
### TUTUILA AND AUNUU

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Descriptions
TAFUNA GCP-1	14°20'30.88269"S	170°43'39.99458"W	8414442.129637	529353.765437	15.268	PK NAIL / PANEL
TAFUNA GCP-2	14°20'22.04491"S	170°43'33.91991"W	8414713.429161	529536.040513	8.455	PK NAIL / PAINTED TARGET
TAFUNA GCP-3	14°20'15.28325"S	170°43'20.05087"W	8414920.665965	529951.711929	7.687	PK NAIL / PANEL
TAFUNA GCP-4	14°20'21.13087"S	170°43'17.78787"W	8414740.933521	530019.280604	7.67	PK NAIL / PAINTED TARGET
TAFUNA GCP-5	14°20'07.05590"S	170°42'52.50467"W	8415172.422658	530777.127597	3.79	PK NAIL / PAINTED TARGET
TAFUNA GCP-6	14°20'07.95458"S	170°43'05.63770"W	8415145.295351	530383.710325	6.64	PAINT STRIPE
TAFUNA GCP-7	14°19'58.70928"S	170°42'44.39310"W	8415428.546855	531020.418372	2.475	PAINT STRIPE
TAFUNA GCP-8	14°19'48.87431"S	170°42'22.72342"W	8415729.882034	531669.897301	1.981	PAINT STRIPE
TAFUNA GCP-9	14°19'39.76427"S	170°42'10.53176"W	8416009.295347	532035.450802	2.103	PAINT STRIPE
TAFUNA GCP-10	14°19'37.49123"S	170°42'01.97825"W	8416078.797738	532291.759748	1.991	PAINT STRIPE
TAFUNA GCP-11	14°19'33.55597"S	170°42'04.29867"W	8416199.786725	532222.407952	1.397	PAINT STRIPE
TAFUNA GCP-12	14°19'35.99078"S	170°42'18.96496"W	8416125.547442	531782.983567	1.705	PAINT STRIPE
TAFUNA GCP-13	14°19'34.26027"S	170°42'34.86329"W	8416179.313915	531306.817019	1.475	PAINT STRIPE
TAFUNA GCP-14	14°19'36.51453"S	170°42'44.21263"W	8416110.407898	531026.671746	2.43	PAINT STRIPE
TAFUNA GCP-15	14°19'47.61247"S	170°42'44.99943"W	8415769.486218	531002.679708	2.225	PAINT STRIPE
TAFUNA GCP-16	14°19'40.96014"S	170°42'42.05100"W	8415973.749230	531091.253098	2.199	PAINT STRIPE
TAFUNA GCP-17	14°19'48.46526"S	170°42'38.08235"W	8415743.028414	531209.844472	2.188	PAINT STRIPE
AOA GCP	14°15'43.95951"S	170°35'06.95978"W	8423234.257447	544736.479435	1.903	CORNER PAINT STRIPE IN BALL COURT
TULA GCP	14°15'14.37979"S	170°33'57.57573"W	8424139.220160	546817.187378	4.24	INSIDE PAINT STRIPE COURT LOT
ALAO GCP	14°15'49.61610"S	170°33'50.40911"W	8423056.278745	547029.905837	3.598	CORNER PAVEMENT CHANGE
AUNUU GCP-1	14°17'15.83550"S	170°33'29.85483"W	8420406.253451	547640.752129	1.618	CORNER OF BASKETBALL COURT
AUNUU GCP-2	14°17'05.41834"S	170°33'36.07893"W	8420726.647231	547454.881334	1.721	CORNER OLD FOUNDATION
AUNUU GCP-3	14°16'57.42566"S	170°33'36.91475"W	8420972.248745	547430.304494	2.338	CORNER OF CONCRETE



**TAFUNA INTERNATIONAL AIRPORT GCP'S**





**AOA, ALAO AND TULA GCP'S**



**AUNUU GCP-1, AUNUU GCP-2 AND AUNUU GCP-3**

## V. GCP's Adjustment Statistics and Report

### Project Summary

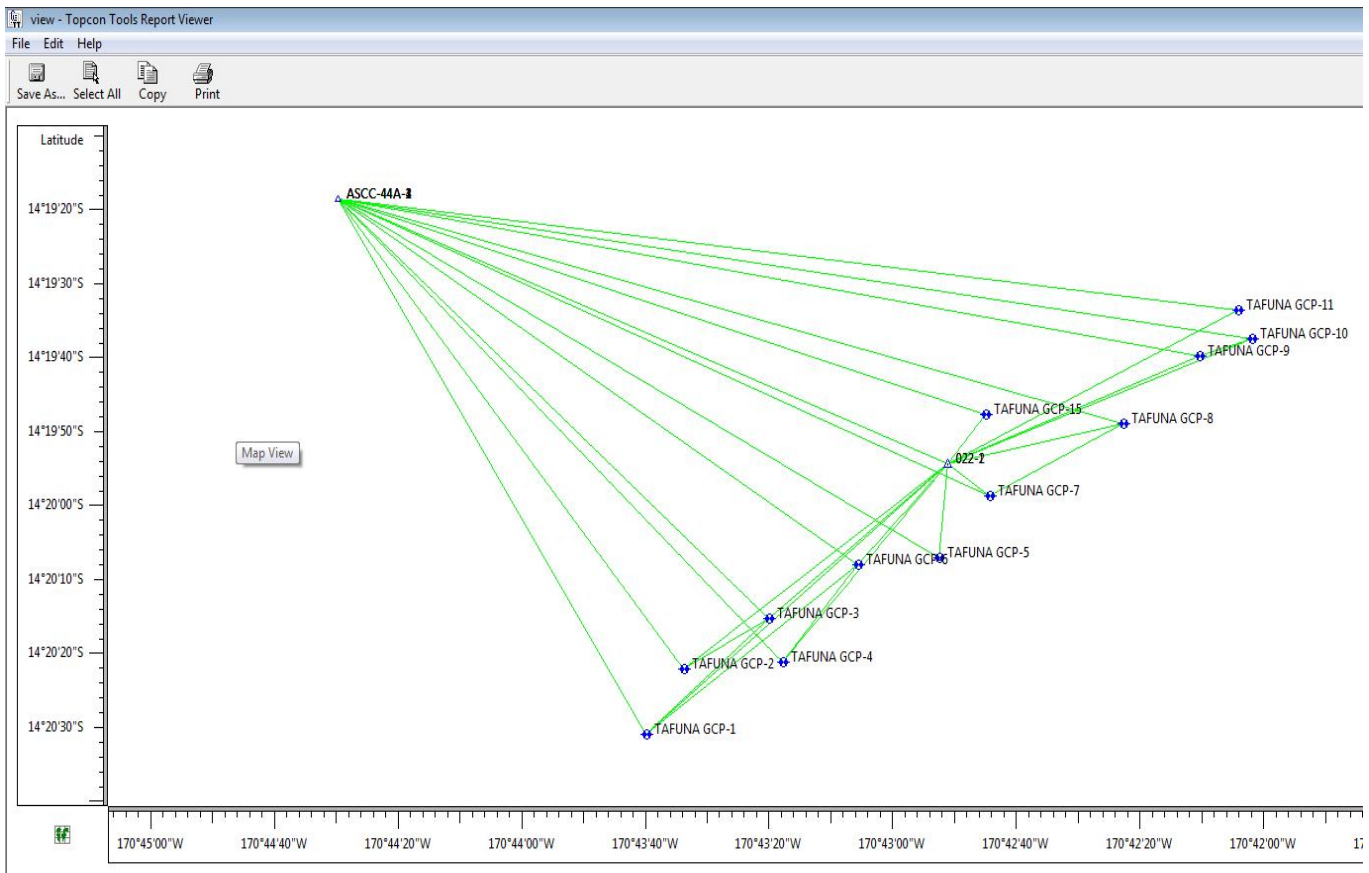
Project name: **PHASE-3 ADJ GCP SET-1**  
Surveyor: **FW**  
Comment:  
Linear unit: **Meters**  
Projection: **UTMSouth-Zone\_2 : 174W to 168W**  
Geoid: **g2012s00**

### Adjustment Summary

Adjusted Components Count: **2**  
Component Points: **ASCC-44A-3, TAFUNA GCP-3, TAFUNA GCP-6, ...**  
Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **14**  
Number of plane control points: **4**  
Number of used GPS vectors: **30**  
Number of rejected GPS vectors by plane: **3**  
A posteriori plane UWE: **3.403404** , Bounds: ( **0.7630193** , **1.236328** )  
Number of height control points: **1**  
A posteriori height UWE: **1.126441** , Bounds: ( **0.6668627** , **1.332622** )

Component Points: **022-1, TAFUNA GCP-11, TAFUNA GCP-15, ...**  
Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **4**  
Number of plane control points: **2**  
Number of used GPS vectors: **5**  
Number of rejected GPS vectors by plane: **2**  
A posteriori plane UWE: **1.029041** , Bounds: ( **0.1590597** , **1.920937** )  
Number of height control points: **1**  
A posteriori height UWE: **2.556545** , Bounds: ( **0.1590597** , **1.920937** )





TAFUNA AIRPORT GCP'S (SET-1)

GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
022-ASCC-44A-1	1103.347	-2950.718	41.579	0.007	0.010
022-TAFUNA GCP-11	638.142	1403.875	-2.442	0.003	0.004
022-TAFUNA GCP-15	207.842	184.148	-1.600	0.001	0.001
022-ASCC-44A-2	1103.373	-2950.720	41.526	0.002	0.004
022-ASCC-44A-3	1103.376	-2950.724	41.535	0.002	0.005
022-ASCC-44A-4	1103.366	-2950.720	41.519	0.005	0.009
022-TAFUNA GCP-1	-1119.514	-1464.765	11.424	0.002	0.004
022-TAFUNA GCP-2	-848.216	-1282.490	4.616	0.002	0.004
022-TAFUNA GCP-3	-640.976	-866.818	3.836	0.001	0.003
022-TAFUNA GCP-4	-820.709	-799.249	3.809	0.001	0.003
022-TAFUNA GCP-5	-389.221	-41.404	-0.068	0.001	0.002
022-TAFUNA GCP-6	-416.347	-434.820	2.796	0.001	0.002
022-TAFUNA GCP-7	-133.097	201.888	-1.369	0.001	0.002
022-TAFUNA GCP-8	168.241	851.366	-1.873	0.001	0.003
022-TAFUNA GCP-9	447.656	1216.925	-1.740	0.002	0.003
022-TAFUNA GCP-10	517.159	1473.234	-1.851	0.002	0.003
ASCC AS-44A-TAFUNA GCP-11	-465.214	4354.616	-43.984	0.006	0.009

ASCC AS-44A-TAFUNA GCP-15	-895.494	3134.846	-43.215	0.014	0.021
ASCC AS-44A-TAFUNA GCP-5	-1492.596	2909.311	-41.592	0.004	0.009
ASCC AS-44A-TAFUNA GCP-7	-1236.472	3152.613	-42.883	0.008	0.016
ASCC AS-44A-TAFUNA GCP-8	-935.133	3802.089	-43.407	0.005	0.010
ASCC AS-44A-TAFUNA GCP-9	-655.718	4167.640	-43.262	0.003	0.006
ASCC AS-44A-TAFUNA GCP-10	-586.214	4423.952	-43.381	0.003	0.005
ASCC AS-44A-TAFUNA GCP-1	-2222.885	1485.957	-30.117	0.004	0.008
ASCC AS-44A-TAFUNA GCP-2	-1951.596	1668.236	-36.901	0.005	0.011
ASCC AS-44A-TAFUNA GCP-3	-1744.351	2083.906	-37.708	0.004	0.009
ASCC AS-44A-TAFUNA GCP-6	-1519.711	2515.898	-38.746	0.009	0.019
ASCC AS-44A-TAFUNA GCP-4	-1924.074	2151.468	-37.724	0.008	0.014
ASCC AS-44A-TAFUNA GCP-6	-1519.711	2515.904	-38.730	0.005	0.009
TAFUNA GCP-1-TAFUNA GCP-3	478.538	597.946	-7.574	0.001	0.002
TAFUNA GCP-1-TAFUNA GCP-6	703.163	1029.944	-8.626	0.001	0.002
TAFUNA GCP-2-TAFUNA GCP-3	207.236	415.672	-0.775	0.001	0.001
TAFUNA GCP-4-TAFUNA GCP-6	404.362	364.430	-1.016	0.001	0.001
TAFUNA GCP-7-TAFUNA GCP-8	301.335	649.479	-0.491	0.001	0.001
TAFUNA GCP-9-TAFUNA GCP-10	69.502	256.309	-0.115	0.001	0.001

Control Points				
Name	Latitude	Longitude	Elevation (m)	Code
022	14°19'54.38513"S	170°42'51.13845"W	3.823	BM
ASCC AS-44A	14°19'18.58372"S	170°44'29.68767"W	45.249	BM

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
022-1-TAFUNA GCP-11(9/3/2012 8:43:10 PM) 022-1-ASCC-44A-1(9/3/2012 8:43:10 PM) ASCC-44A-1-TAFUNA GCP-11(9/3/2012 8:41:59 PM)	0.0245	0.0376	0.0754	0.1054	2.7	4.15	9075.8584
022-1-TAFUNA GCP-15(9/3/2012 10:18:32 PM) 022-1-ASCC-44A-1(9/3/2012 8:43:10 PM) ASCC-44A-1-TAFUNA GCP-15(9/3/2012 10:18:32 PM)	0.0227	0.0361	0.0635	0.0935	3.4	5.39	6691.41
022-2-ASCC-44A-2(9/3/2012 1:44:40 PM) 022-2-TAFUNA GCP-10(9/3/2012 3:32:56 PM) ASCC-44A-2-TAFUNA GCP-10(9/3/2012 3:32:56 PM)	0.0019	0.0043	0.0759	0.1059	0.2	0.46	9178.3887
022-2-ASCC-44A-3(9/3/2012 10:24:30 AM)	0.0055	0.0063	0.0684	0.0984	0.72	0.82	7671.2166



022-2-TAFUNA GCP-1(9/3/2012 12:11:03 PM) ASCC-44A-3-TAFUNA GCP-1(9/3/2012 12:11:03 PM)							
022-2-ASCC-44A-3(9/3/2012 10:24:30 AM) 022-2-TAFUNA GCP-2(9/3/2012 11:27:41 AM) ASCC-44A-3-TAFUNA GCP-2(9/3/2012 11:27:41 AM)	0.0042	0.0184	0.0663	0.0963	0.58	2.53	7258.7562
022-2-ASCC-44A-4(9/3/2012 12:53:10 PM) 022-2-TAFUNA GCP-4(9/3/2012 1:05:51 PM) ASCC-44A-4-TAFUNA GCP-4(9/3/2012 1:05:51 PM)	0.0032	0.0148	0.0659	0.0959	0.45	2.06	7185.5605
022-2-TAFUNA GCP-3(9/3/2012 11:47:54 AM) 022-2-TAFUNA GCP-1(9/3/2012 12:11:03 PM) TAFUNA GCP-1-TAFUNA GCP-3(9/3/2012 12:11:03 PM)	0.0017	0.0143	0.0484	0.0784	0.46	3.88	3689.057
022-2-TAFUNA GCP-3(9/3/2012 11:47:54 AM) 022-2-TAFUNA GCP-2(9/3/2012 11:27:41 AM) TAFUNA GCP-2-TAFUNA GCP-3(9/3/2012 11:47:54 AM)	0.004	0.004	0.0454	0.0754	1.31	1.3	3081.3757
022-2-TAFUNA GCP-5(9/3/2012 1:47:08 PM) 022-2-ASCC-44A-2(9/3/2012 1:44:40 PM) ASCC-44A-2-TAFUNA GCP-5(9/3/2012 1:47:08 PM)	0.0054	0.0025	0.0641	0.0941	0.79	0.36	6814.7874
022-2-TAFUNA GCP-6(9/3/2012 12:39:07 PM) 022-2-TAFUNA GCP-4(9/3/2012 1:05:51 PM) TAFUNA GCP-4-TAFUNA GCP-6(9/3/2012 1:05:51 PM)	0.0014	0.0024	0.0415	0.0715	0.61	1.05	2292.8618
022-2-TAFUNA GCP-6(9/3/2012 12:39:07 PM) 022-2-TAFUNA GCP-1(9/3/2012 12:11:03 PM) TAFUNA GCP-1-TAFUNA GCP-6(9/3/2012 12:39:07 PM)	0.0041	0.0028	0.0485	0.0785	1.1	0.76	3694.2232
022-2-TAFUNA GCP-7(9/3/2012 2:33:14 PM) 022-2-ASCC-44A-2(9/3/2012 1:44:40 PM) ASCC-44A-2-TAFUNA GCP-7(9/3/2012 2:33:14 PM)	0.006	0.0124	0.0639	0.0939	0.88	1.83	6781.7474
022-2-TAFUNA GCP-7(9/3/2012 2:33:14 PM) 022-2-TAFUNA GCP-8(9/3/2012 2:40:44 PM) TAFUNA GCP-7-TAFUNA GCP-8(9/3/2012 2:40:44 PM)	0.0033	0.0126	0.0391	0.0691	1.81	6.87	1826.3469
022-2-TAFUNA GCP-8(9/3/2012 2:40:44 PM) 022-2-ASCC-44A-2(9/3/2012 1:44:40 PM) ASCC-44A-2-TAFUNA GCP-8(9/3/2012 2:40:44 PM)	0.0031	0.0076	0.0697	0.0997	0.4	0.95	7937.1686
022-2-TAFUNA GCP-9(9/3/2012 3:27:30 PM) 022-2-TAFUNA GCP-10(9/3/2012 3:32:56 PM) TAFUNA GCP-9-TAFUNA GCP-10(9/3/2012 3:32:56 PM)	0.0005	0.0046	0.0456	0.0756	0.17	1.48	3124.8154
022-2-TAFUNA GCP-9(9/3/2012 3:27:30 PM) 022-2-ASCC-44A-2(9/3/2012 1:44:40 PM) ASCC-44A-2-TAFUNA GCP-9(9/3/2012 3:27:30 PM)	0.0052	0.0044	0.0734	0.1033	0.6	0.51	8669.767
ASCC-44A-2-TAFUNA GCP-9(9/3/2012	0.0036	0.0041	0.0748	0.1048	0.41	0.45	8951.0875

3:27:30 PM) ASCC-44A-2-TAFUNA GCP-10(9/3/2012 3:32:56 PM) TAFUNA GCP-9-TAFUNA GCP- 10(9/3/2012 3:32:56 PM)							
ASCC-44A-3-TAFUNA GCP-3(9/3/2012 11:47:54 AM) ASCC-44A-3-TAFUNA GCP-1(9/3/2012 12:11:03 PM) TAFUNA GCP-1-TAFUNA GCP- 3(9/3/2012 12:11:03 PM)	0.0049	0.0171	0.0608	0.0908	0.8	2.78	6160.2125
ASCC-44A-3-TAFUNA GCP-3(9/3/2012 11:47:54 AM) ASCC-44A-3-TAFUNA GCP-2(9/3/2012 11:27:41 AM) TAFUNA GCP-2-TAFUNA GCP- 3(9/3/2012 11:47:54 AM)	0.0088	0.0315	0.0588	0.0888	1.53	5.47	5752.3405
ASCC-44A-3-TAFUNA GCP-3(9/3/2012 11:47:54 AM) 022-2-ASCC-44A-3(9/3/2012 10:24:30 AM) 022-2-TAFUNA GCP-3(9/3/2012 11:47:54 AM)	0.0011	0.0091	0.0647	0.0947	0.16	1.31	6949.2583
ASCC-44A-3-TAFUNA GCP-6(9/3/2012 12:39:07 PM) ASCC-44A-3-TAFUNA GCP-1(9/3/2012 12:11:03 PM) TAFUNA GCP-1-TAFUNA GCP- 6(9/3/2012 12:39:07 PM)	0.011	0.0032	0.0643	0.0943	1.61	0.47	6863.3546
ASCC-44A-3-TAFUNA GCP-6(9/3/2012 12:39:07 PM) 022-2-ASCC-44A-3(9/3/2012 10:24:30 AM) 022-2-TAFUNA GCP-6(9/3/2012 12:39:07 PM)	0.0132	0.0067	0.0635	0.0935	1.97	1	6694.7436
ASCC-44A-4-TAFUNA GCP-6(9/3/2012 12:53:10 PM) ASCC-44A-4-TAFUNA GCP-4(9/3/2012 1:05:51 PM) TAFUNA GCP-4-TAFUNA GCP- 6(9/3/2012 1:05:51 PM)	0.0057	0.0108	0.0619	0.0919	0.9	1.7	6372.9874
ASCC-44A-4-TAFUNA GCP-6(9/3/2012 12:53:10 PM) 022-2-ASCC-44A-4(9/3/2012 12:53:10 PM) 022-2-TAFUNA GCP-6(9/3/2012 12:39:07 PM)	0.0044	0.0064	0.0635	0.0935	0.65	0.95	6694.741
TAFUNA GCP-7-TAFUNA GCP- 8(9/3/2012 2:40:44 PM) ASCC-44A-2-TAFUNA GCP-7(9/3/2012 2:33:14 PM) ASCC-44A-2-TAFUNA GCP-8(9/3/2012 2:40:44 PM)	0.0056	0.0325	0.0701	0.1001	0.7	4.05	8021.4995

## Adjusted Points

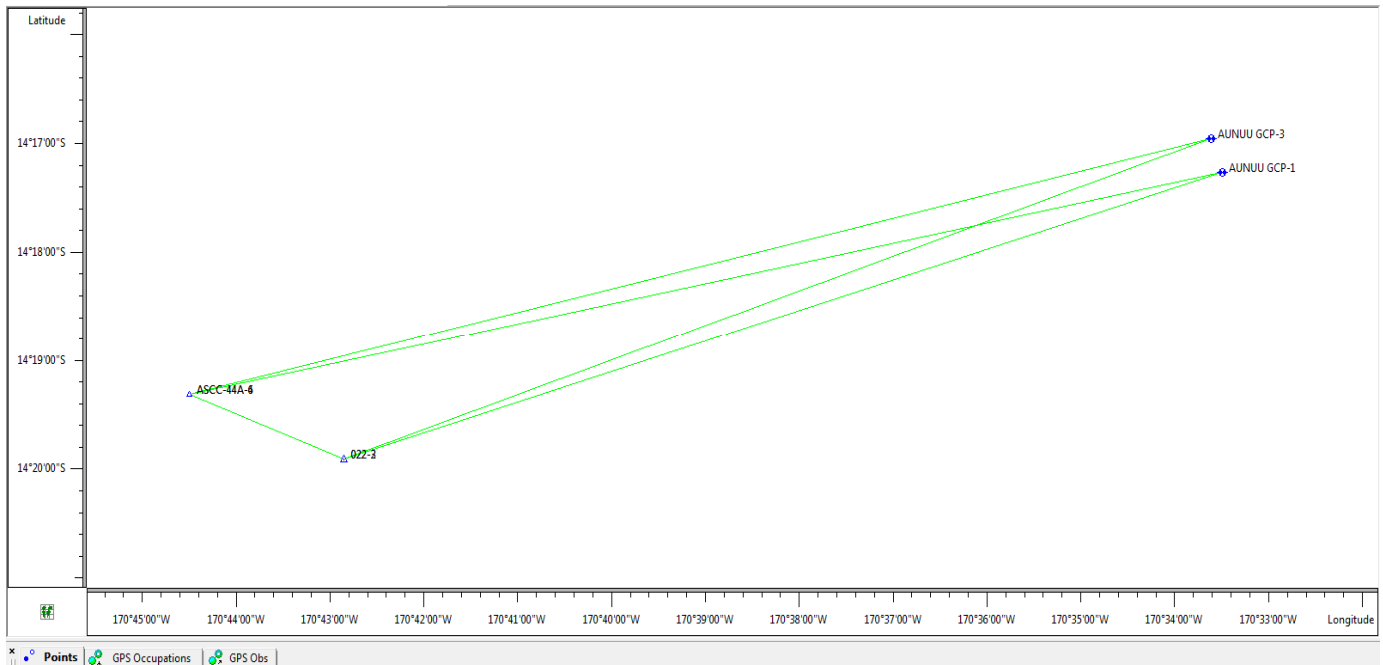
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
TAFUNA GCP-1	14°20'30.88269"S	170°43'39.99458"W	15.268	GCP
TAFUNA GCP-2	14°20'22.04491"S	170°43'33.91991"W	8.455	GCP
TAFUNA GCP-3	14°20'15.28325"S	170°43'20.05087"W	7.687	GCP
TAFUNA GCP-4	14°20'21.13087"S	170°43'17.78787"W	7.670	GCP
TAFUNA GCP-5	14°20'07.05590"S	170°42'52.50467"W	3.790	GCP
TAFUNA GCP-6	14°20'07.95458"S	170°43'05.63770"W	6.640	GCP
TAFUNA GCP-7	14°19'58.70928"S	170°42'44.39310"W	2.475	GCP
TAFUNA GCP-8	14°19'48.87431"S	170°42'22.72342"W	1.981	GCP
TAFUNA GCP-9	14°19'39.76427"S	170°42'10.53176"W	2.103	GCP
TAFUNA GCP-10	14°19'37.49123"S	170°42'01.97825"W	1.991	GCP
TAFUNA GCP-11	14°19'33.55597"S	170°42'04.29867"W	1.397	GCP
TAFUNA GCP-15	14°19'47.61247"S	170°42'44.99943"W	2.225	GCP

## Project Summary

Project name: **PHASE-3 ADJ GCP SET-2**  
 Surveyor:  
 Comment:  
 Linear unit: **Meters**  
 Projection: **UTMSouth-Zone\_2 : 174W to 168W**  
 Geoid: **g2012s00**

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**  
 Confidence level: **95 %**  
 Number of adjusted points: **4**  
 Number of plane control points: **2**  
 Number of used GPS vectors: **5**  
 Number of rejected GPS vectors by plane: **1**  
 A posteriori plane UWE: **0.8724663** , Bounds: ( **0.3478505** , **1.668832** )  
 Number of height control points: **1**  
 A posteriori height UWE: **9.717882E-02** , Bounds: ( **0.1590597** , **1.920937** )



AUNUU GCP'S (SET-2)

GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
022-2-ASCC-44A-4	1103.343	-2950.723	41.555	0.002	0.004
022-2-AUNUU GCP-1	4844.608	16822.230	-2.611	0.013	0.022
022-2-AUNUU GCP-3	5410.596	16611.770	-1.857	0.015	0.027
ASCC-44A-4-AUNUU GCP-1	3741.252	19772.948	-44.162	0.011	0.019
ASCC-44A-4-AUNUU GCP-3	4307.248	19562.509	-43.411	0.010	0.018

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
022	14°19'54.38513"S	170°42'51.13845"W	3.823	BM
ASCC AS-44A	14°19'18.58372"S	170°44'29.68767"W	45.249	BM

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
022-2-ASCC-44A-4(9/4/2012 10:49:10 AM) 022-2-AUNUU GCP-3(9/4/2012 1:31:16 PM) ASCC-44A-4-AUNUU GCP-3(9/4/2012 1:31:16 PM)	0.0161	0.0002	0.2333	0.2633	0.4	0	40668.1941
ASCC-44A-4-AUNUU GCP-1(9/4/2012 12:34:20 PM) 022-2-ASCC-44A-4(9/4/2012 10:49:10 AM) 022-2-AUNUU GCP-1(9/4/2012 12:34:20 PM)	0.0143	0.0041	0.234	0.264	0.35	0.1	40796.1671

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
AUNUU GCP-1	14°17'15.83550"S	170°33'29.85483"W	1.618	GCP
AUNUU GCP-3	14°16'57.42566"S	170°33'36.91475"W	2.338	GCP



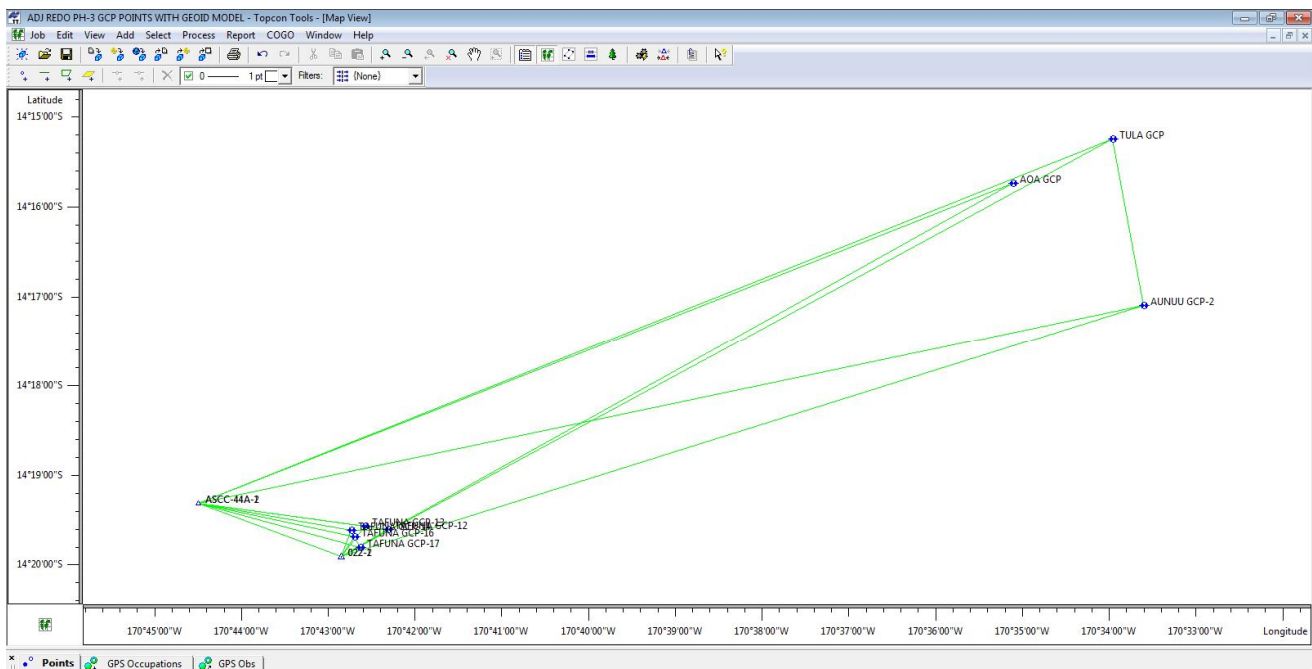
# Project Summary

Project name: **PHASE-3 ADJ GCP SET-3**  
Surveyor: **FW**  
Comment:  
Linear unit: **Meters**  
Projection: **UTMSouth-Zone\_2 : 174W to 168W**  
Geoid: **g2012s00**

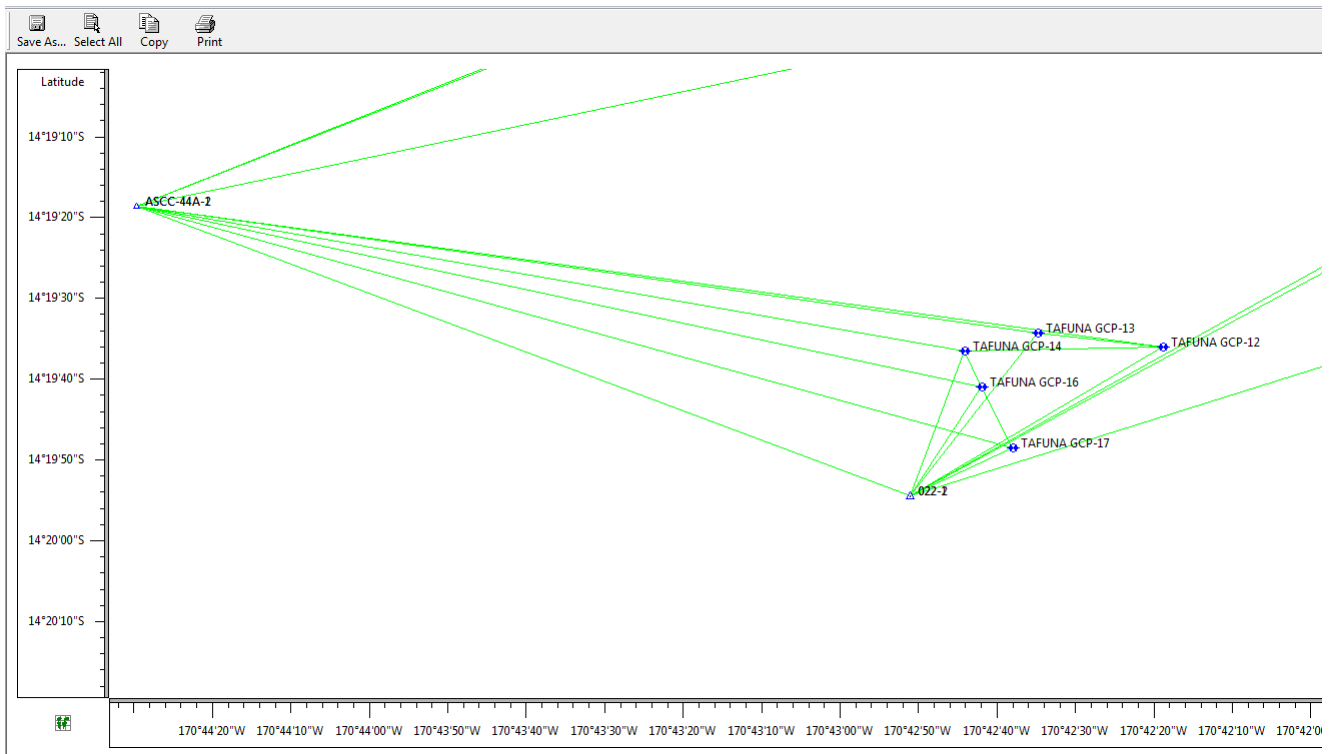
# Adjustment Summary

Adjusted Components Count: **2**  
Component Points: **TAFUNA GCP-14, TAFUNA GCP-16, TAFUNA GCP-17, ...**  
Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **7**  
Number of plane control points: **2**  
Number of used GPS vectors: **15**  
Number of rejected GPS vectors by plane: **5**  
A posteriori plane UWE: **2.029712** , Bounds: ( **0.5700877** , **1.431083** )  
Number of height control points: **1**  
A posteriori height UWE: **1.622411** , Bounds: ( **0.5477226** , **1.453731** )

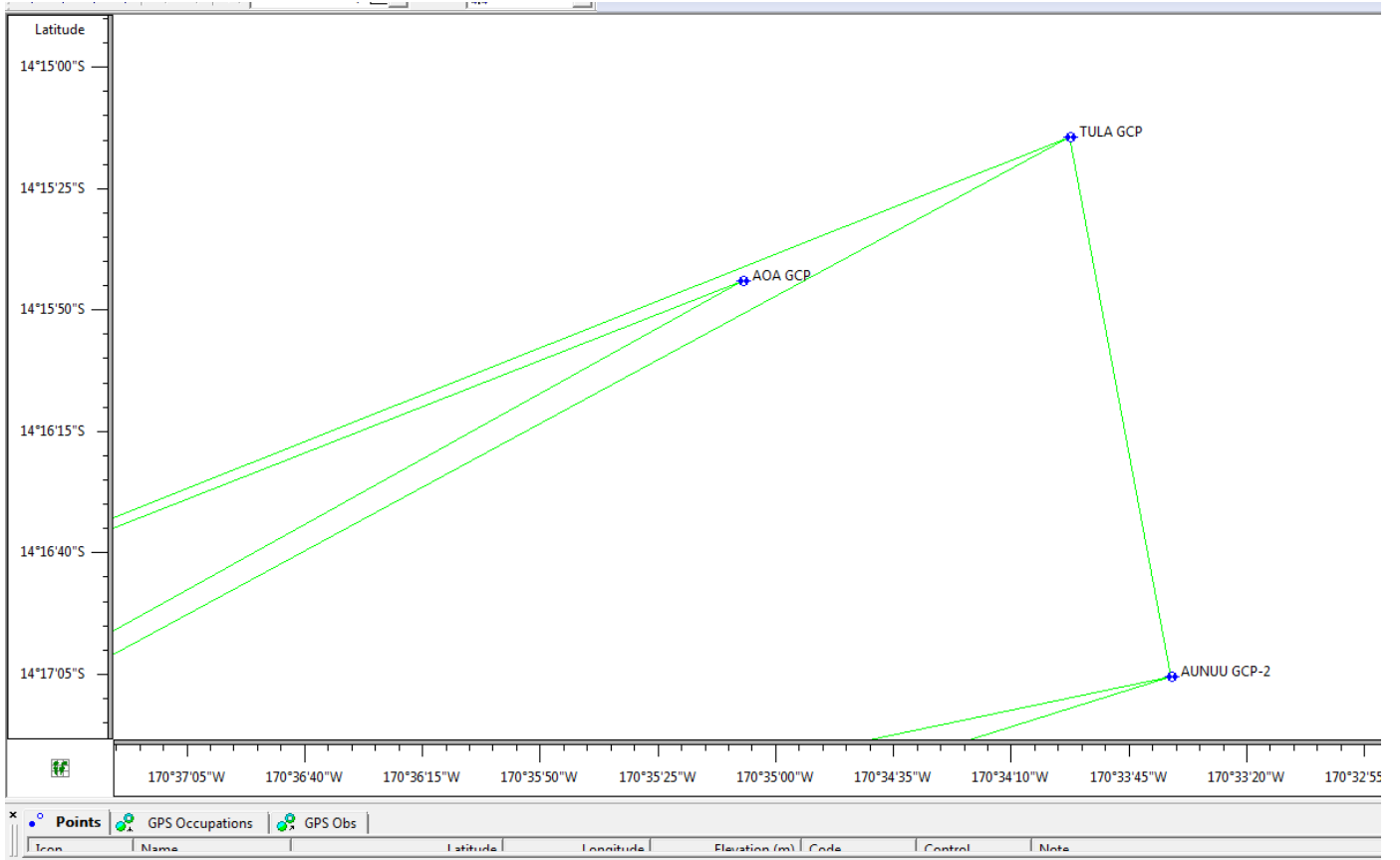
Component Points: **ASCC-44A-1, TULA GCP, 022-2, ...**  
Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **5**  
Number of plane control points: **2**  
Number of used GPS vectors: **8**  
Number of rejected GPS vectors by plane: **4**  
A posteriori plane UWE: **1.299025** , Bounds: ( **0.1590597** , **1.920937** )  
Number of height control points: **1**  
A posteriori height UWE: **1.375244** , Bounds: ( **0.3478505** , **1.668832** )



SET-3 GCP'S



TAFUNA AIRPORT GCP'S (SET-3)



AOA, AUNUU AND TULA GCP'S (SET-3)

## GPS Observation Residuals

Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
022-ASCC AS-44A	1103.346	-2950.719	41.547	0.004	0.007
022-TAFUNA GCP-12	563.902	964.450	-2.135	0.002	0.003
022-TAFUNA GCP-13	617.670	488.286	-2.332	0.002	0.004
022-TAFUNA GCP-14	548.764	208.142	-1.366	0.002	0.004
022-TAFUNA GCP-16	412.106	272.723	-1.613	0.001	0.002
022-TAFUNA GCP-17	181.383	391.313	-1.646	0.001	0.002
022-AOA GCP	7672.614	13917.956	-2.126	0.009	0.019
022-AUNUU GCP-2	5165.003	16636.350	-2.481	0.007	0.024
022-TULA GCP	8577.648	15998.647	0.108	0.010	0.025
AOA GCP-ASCC AS-44A	-6569.252	-16868.675	43.668	0.008	0.016
ASCC AS-44A-AUNUU GCP-2	4061.690	19587.223	-44.066	0.012	0.022
ASCC AS-44A-TULA GCP	7474.216	18949.305	-41.487	0.020	0.039
ASCC AS-44A-TAFUNA GCP-12	-539.444	3915.166	-43.662	0.007	0.014
ASCC AS-44A-TAFUNA GCP-13	-485.678	3438.997	-43.875	0.008	0.014
ASCC AS-44A-TAFUNA GCP-14	-554.576	3158.858	-42.929	0.007	0.015
ASCC AS-44A-TAFUNA GCP-16	-691.239	3223.441	-43.173	0.004	0.010
ASCC AS-44A-TAFUNA GCP-17	-921.963	3342.034	-43.202	0.005	0.013
AUNUU GCP-2-TULA GCP	3412.573	-637.694	2.535	0.004	0.009
TAFUNA GCP-12-TAFUNA GCP-13	53.767	-476.167	-0.213	0.001	0.001
TAFUNA GCP-12-TAFUNA GCP-14	-15.141	-756.313	0.742	0.001	0.002
TAFUNA GCP-14-TAFUNA GCP-16	-136.659	64.581	-0.243	0.000	0.001
TAFUNA GCP-16-TAFUNA GCP-17	-230.721	118.592	-0.028	0.000	0.001

## Control Points

Name	Latitude	Longitude	Elevation (Datum) (m)	Code
022	14°19'54.38513"S	170°42'51.13845"W	3.823	BM
ASCC AS-44A	14°19'18.58372"S	170°44'29.68767"W	45.248	BM

## Loop Closures

Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
022-1-ASCC-44A-2(9/19/2012 4:46:50 PM) 022-1-TAFUNA GCP-12(9/19/2012 5:14:11 PM) ASCC-44A-2-TAFUNA GCP-12(9/19/2012 5:14:11 PM)	0.002	0.0202	0.0711	0.1011	0.24	2.46	8223.4019
022-1-TAFUNA GCP-13(9/19/2012 5:11:07 PM) 022-1-TAFUNA GCP-12(9/19/2012 5:14:11 PM) TAFUNA GCP-12-TAFUNA GCP-13(9/19/2012 5:14:11 PM)	0.0032	0.0165	0.0419	0.0719	1.32	6.94	2384.7041
022-1-TAFUNA GCP-14(9/19/2012 5:44:14 PM) 022-1-TAFUNA GCP-12(9/19/2012 5:14:11 PM) TAFUNA GCP-12-TAFUNA GCP-14(9/19/2012 5:44:14 PM)	0.0062	0.0275	0.0423	0.0723	2.51	11.15	2461.5546
022-2-ASCC-44A-1(9/19/2012 10:29:00 AM) 022-2-AUNUU GCP-2(9/19/2012 12:38:16 PM) ASCC-44A-1-AUNUU GCP-2(9/19/2012 12:38:16 PM)	0.1628	0.0423	0.233	0.2629	4.01	1.04	40589.9658
022-2-ASCC-44A-1(9/19/2012 10:29:00 AM) 022-2-AOA GCP(9/19/2012 1:23:30 PM) AOA GCP-ASCC-44A-1(9/19/2012 1:23:30 PM)	0.0301	0.0011	0.2158	0.2458	0.81	0.03	37160.4934
022-2-TULA GCP(9/19/2012 12:24:46 PM) 022-2-AUNUU GCP-2(9/19/2012 12:38:16 PM) AUNUU GCP-2-TULA GCP(9/19/2012 12:38:16 PM)	0.0723	0.0538	0.2253	0.2553	1.85	1.38	39059.4272
ASCC-44A-1-TULA GCP(9/19/2012 12:24:46 PM) ASCC-44A-1-AUNUU GCP-2(9/19/2012 12:38:16 PM) AUNUU GCP-2-TULA GCP(9/19/2012 12:38:16 PM)	0.2289	0.0432	0.2493	0.2793	5.22	0.98	43862.8259
ASCC-44A-1-TULA GCP(9/19/2012 12:24:46 PM) 022-2-ASCC-44A-1(9/19/2012 10:29:00 AM) 022-2-TULA GCP(9/19/2012 12:24:46 PM)	0.113	0.0524	0.2385	0.2684	2.71	1.26	41689.9205
ASCC-44A-2-TAFUNA GCP-13(9/19/2012 5:11:07 PM) ASCC-44A-2-TAFUNA GCP-12(9/19/2012 5:14:11 PM) TAFUNA GCP-12-TAFUNA GCP-13(9/19/2012 5:14:11 PM)	0.0026	0.0005	0.0695	0.0995	0.33	0.06	7908.1332
ASCC-44A-2-TAFUNA GCP-13(9/19/2012 5:11:07 PM) 022-1-ASCC-44A-2(9/19/2012 4:46:50 PM) 022-1-TAFUNA GCP-13(9/19/2012 5:11:07 PM)	0.0076	0.0032	0.0671	0.0971	1.02	0.43	7414.2443
ASCC-44A-2-TAFUNA GCP-14(9/19/2012 5:44:14 PM) ASCC-44A-2-TAFUNA GCP-12(9/19/2012 5:14:11 PM) TAFUNA GCP-12-TAFUNA GCP-14(9/19/2012 5:44:14 PM)	0.0095	0.0088	0.0696	0.0996	1.2	1.11	7919.466

ASCC-44A-2-TAFUNA GCP-14(9/19/2012 5:44:14 PM) 022-1-ASCC-44A-2(9/19/2012 4:46:50 PM) 022-1-TAFUNA GCP-14(9/19/2012 5:44:14 PM)	0.0061	0.016	0.0647	0.0947	0.88	2.31	6947.6647
ASCC-44A-2-TAFUNA GCP-16(9/19/2012 6:04:20 PM) 022-1-ASCC-44A-2(9/19/2012 4:46:50 PM) 022-1-TAFUNA GCP-16(9/19/2012 6:04:20 PM)	0.0013	0.0131	0.0647	0.0947	0.19	1.89	6944.4769
ASCC-44A-2-TAFUNA GCP-17(9/19/2012 6:19:05 PM) 022-1-ASCC-44A-2(9/19/2012 4:46:50 PM) 022-1-TAFUNA GCP-17(9/19/2012 6:19:05 PM)	0.0022	0.0088	0.0653	0.0953	0.31	1.25	7051.7886
TAFUNA GCP-14-TAFUNA GCP-16(9/19/2012 6:04:20 PM) 022-1-TAFUNA GCP-14(9/19/2012 5:44:14 PM) 022-1-TAFUNA GCP-16(9/19/2012 6:04:20 PM)	0.001	0.0033	0.0362	0.0662	0.83	2.66	1232.7274
TAFUNA GCP-14-TAFUNA GCP-16(9/19/2012 6:04:20 PM) ASCC-44A-2-TAFUNA GCP-14(9/19/2012 5:44:14 PM) ASCC-44A-2-TAFUNA GCP-16(9/19/2012 6:04:20 PM)	0.0038	0.0004	0.0633	0.0933	0.58	0.06	6658.2636
TAFUNA GCP-16-TAFUNA GCP-17(9/19/2012 6:19:05 PM) 022-1-TAFUNA GCP-16(9/19/2012 6:04:20 PM) 022-1-TAFUNA GCP-17(9/19/2012 6:19:05 PM)	0.0025	0.0051	0.0359	0.0659	2.12	4.32	1185.3702
TAFUNA GCP-16-TAFUNA GCP-17(9/19/2012 6:19:05 PM) ASCC-44A-2-TAFUNA GCP-16(9/19/2012 6:04:20 PM) ASCC-44A-2-TAFUNA GCP-17(9/19/2012 6:19:05 PM)	0.0028	0.0008	0.0651	0.0951	0.4	0.12	7026.3589

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
AOA GCP	14°15'43.95951"S	170°35'06.95978"W	1.903	GCP
AUNUU GCP-2	14°17'05.41834"S	170°33'36.07893"W	1.721	GCP
TAFUNA GCP-12	14°19'35.99078"S	170°42'18.96496"W	1.705	GCP
TAFUNA GCP-13	14°19'34.26027"S	170°42'34.86329"W	1.475	GCP
TAFUNA GCP-14	14°19'36.51453"S	170°42'44.21263"W	2.430	GCP
TAFUNA GCP-16	14°19'40.96014"S	170°42'42.05100"W	2.199	GCP
TAFUNA GCP-17	14°19'48.46526"S	170°42'38.08235"W	2.188	GCP
TULA GCP	14°15'14.37979"S	170°33'57.57573"W	4.240	GCP



## Project Summary

Project name: **PHASE-3 ADJ GCP SET-4**

Surveyor: **FW**

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid: **g2012s00**

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **3**

Number of plane control points: **2**

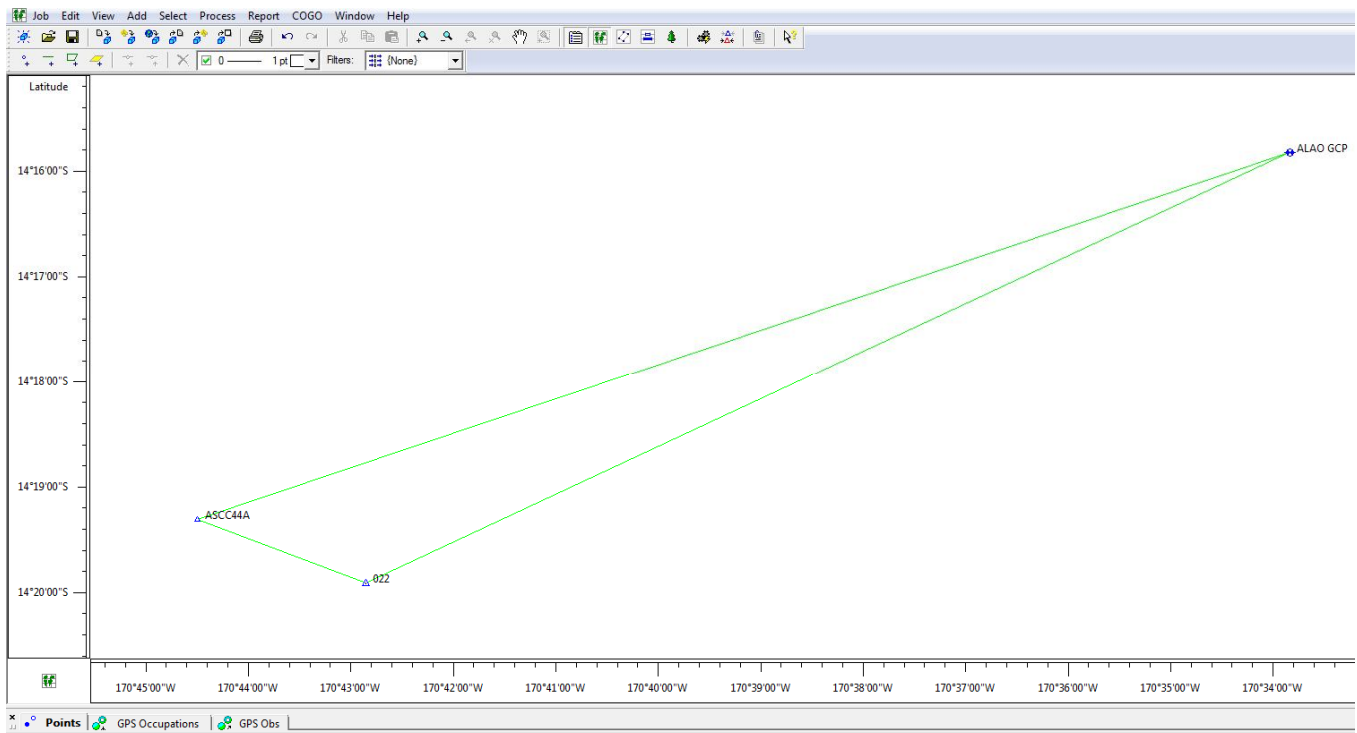
Number of used GPS vectors: **3**

Number of rejected GPS vectors by plane: **1**

A posteriori plane UWE: **0.942781** , Bounds: ( **0.1590597** , **1.920937** )

Number of height control points: **1**

A posteriori height UWE: **1.238013** , Bounds: ( **3.130495E-02** , **2.240536** )



ALAO GCP (SET-4)

GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
022-ALAO GCP	7494.634	16211.429	-0.533	0.014	0.025
022-ASCC AS-44A	1103.362	-2950.737	41.552	0.003	0.006
ALAO GCP-ASCC AS-44A	-6391.275	-19162.110	42.123	0.008	0.015

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
022	14°19'54.38513"S	170°42'51.13845"W	3.823	BM
ASCC AS-44A	14°19'18.58372"S	170°44'29.68767"W	45.249	BM

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
022-ASCC AS-44A(9/20/2012 10:35:21 AM) 022-ALAO GCP(9/20/2012 10:54:11 AM) ALAO GCP-ASCC AS-44A(9/20/2012 10:54:11 AM)	0.0563	0.0372	0.2361	0.2661	1.37	0.9	41226.5389

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
ALAO GCP	14°15'49.61610"S	170°33'50.40911"W	3.598	GCP

VI.

Data Log Sheets with Photographs

POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TAI,TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: TAFUNA GCP-1

ANTENNA HEIGHT: 2M

START TIME: 12:11PM

STOP TIME: 12:49PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PK NAIL SET FLUSH WITH THE GROUND

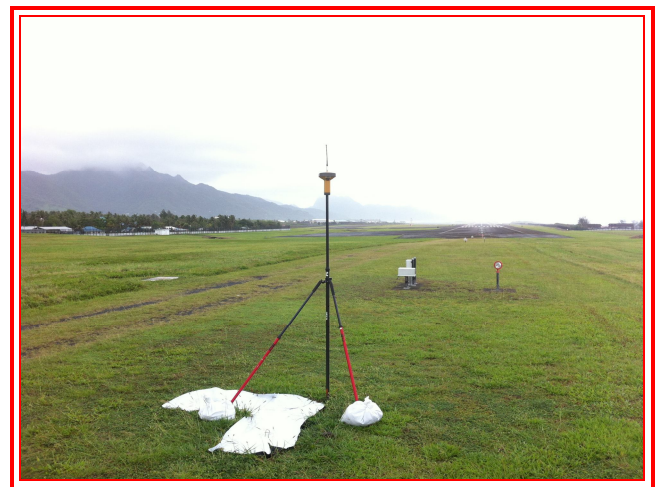
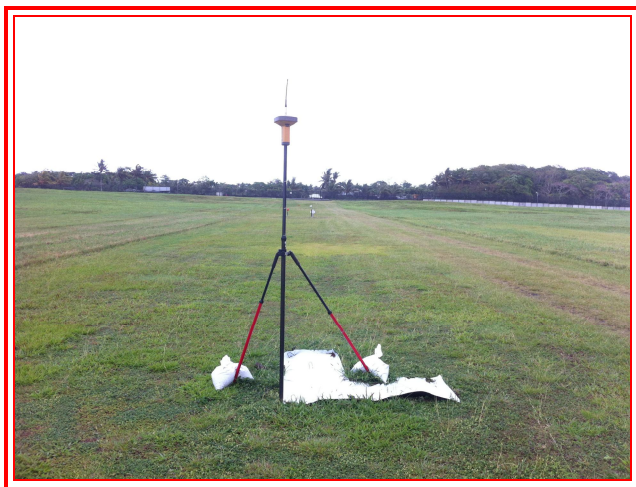
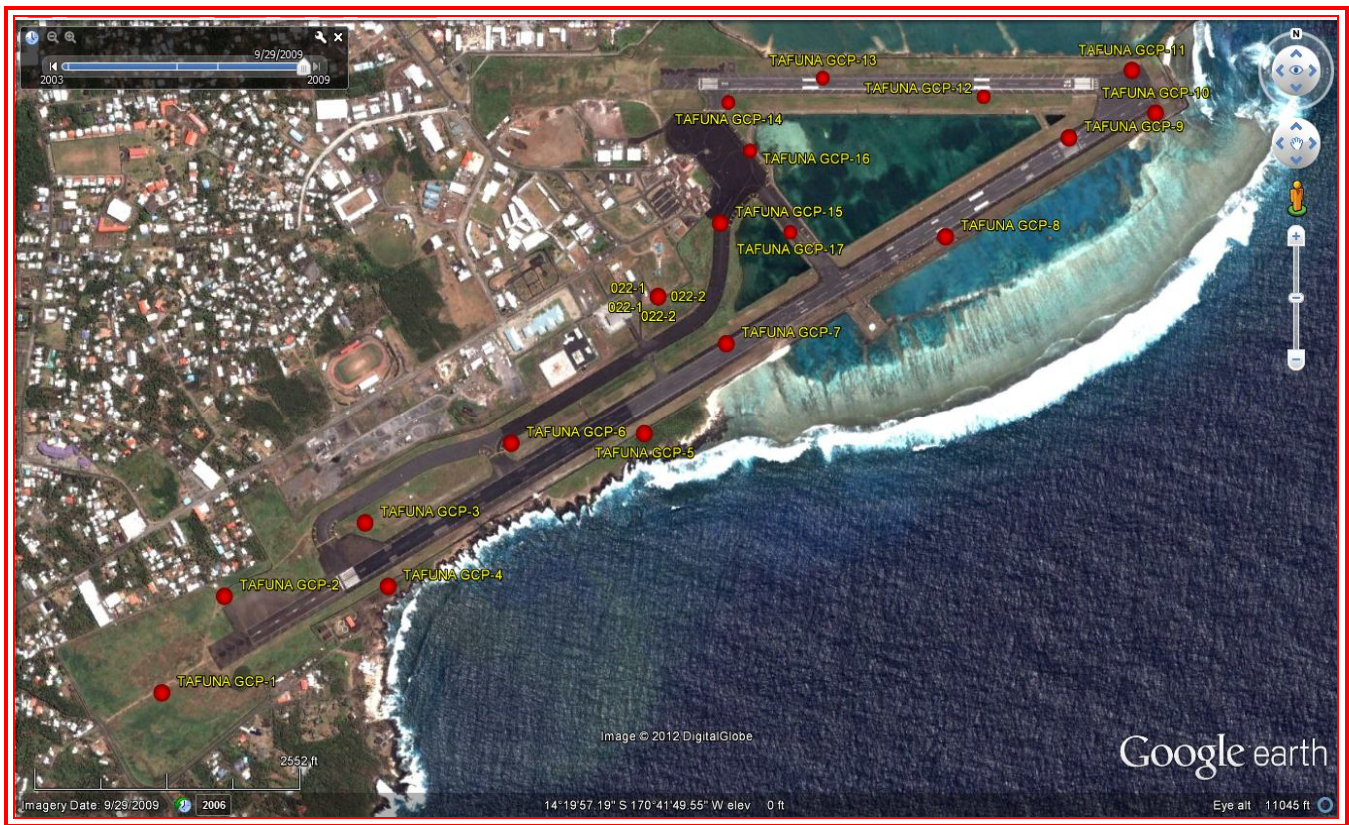
FABRIC TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED ON THE SOUTHWEST END OF RUNWAY #5

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SKETCH AREA (NTS)



TAFUNA GCP-1



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: TAFUNA GCP-2

ANTENNA HEIGHT: 2M

START TIME: 11:27AM

STOP TIME: 12:06PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PK NAIL SET FLUSH WITH THE GROUND  
PAINTED TARGET

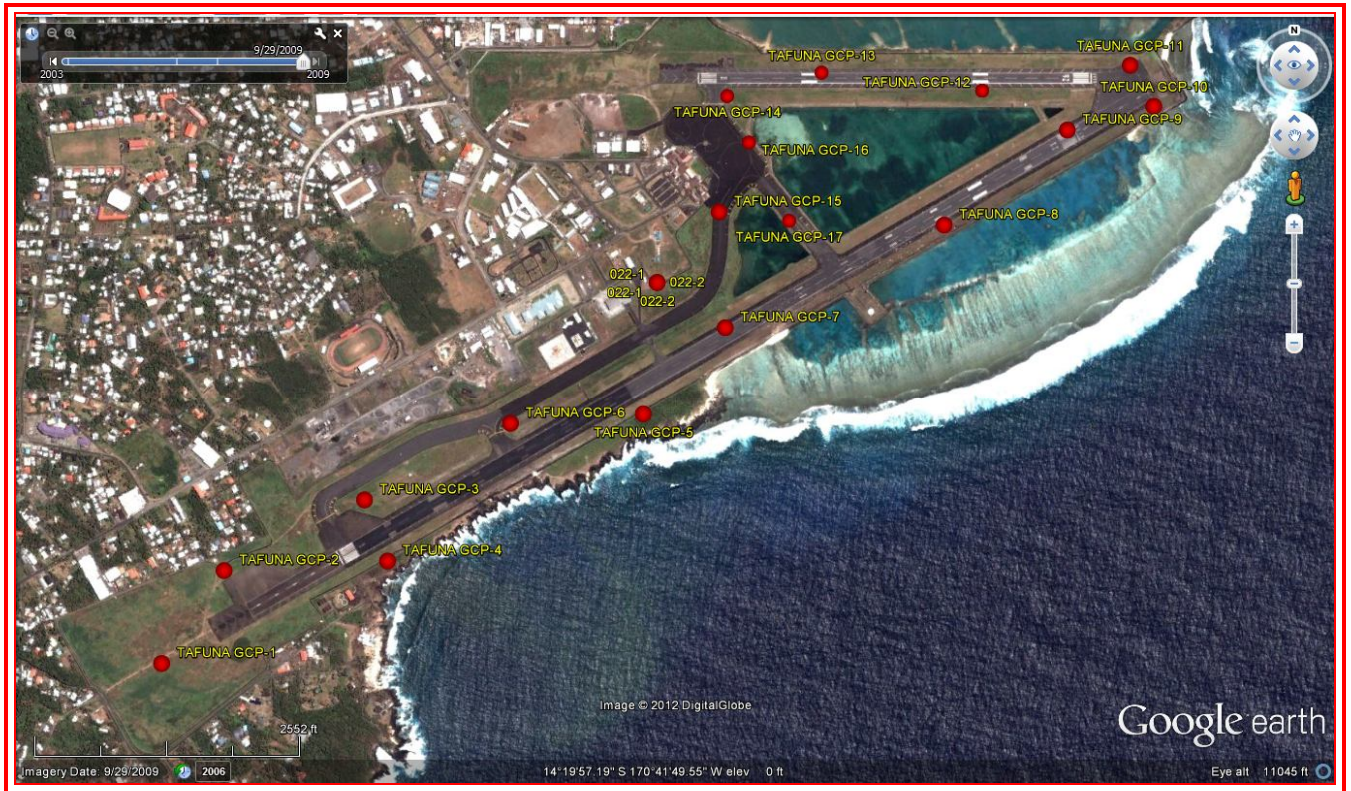
LOCATION: MARK IS LOCATED ON THE NORTHWEST END OF RUNWAY #5

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SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





## TAFUNA GCP-2

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: TAFUNA GCP-3

ANTENNA HEIGHT: 2M

START TIME: 11:47AM

STOP TIME: 12:29PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

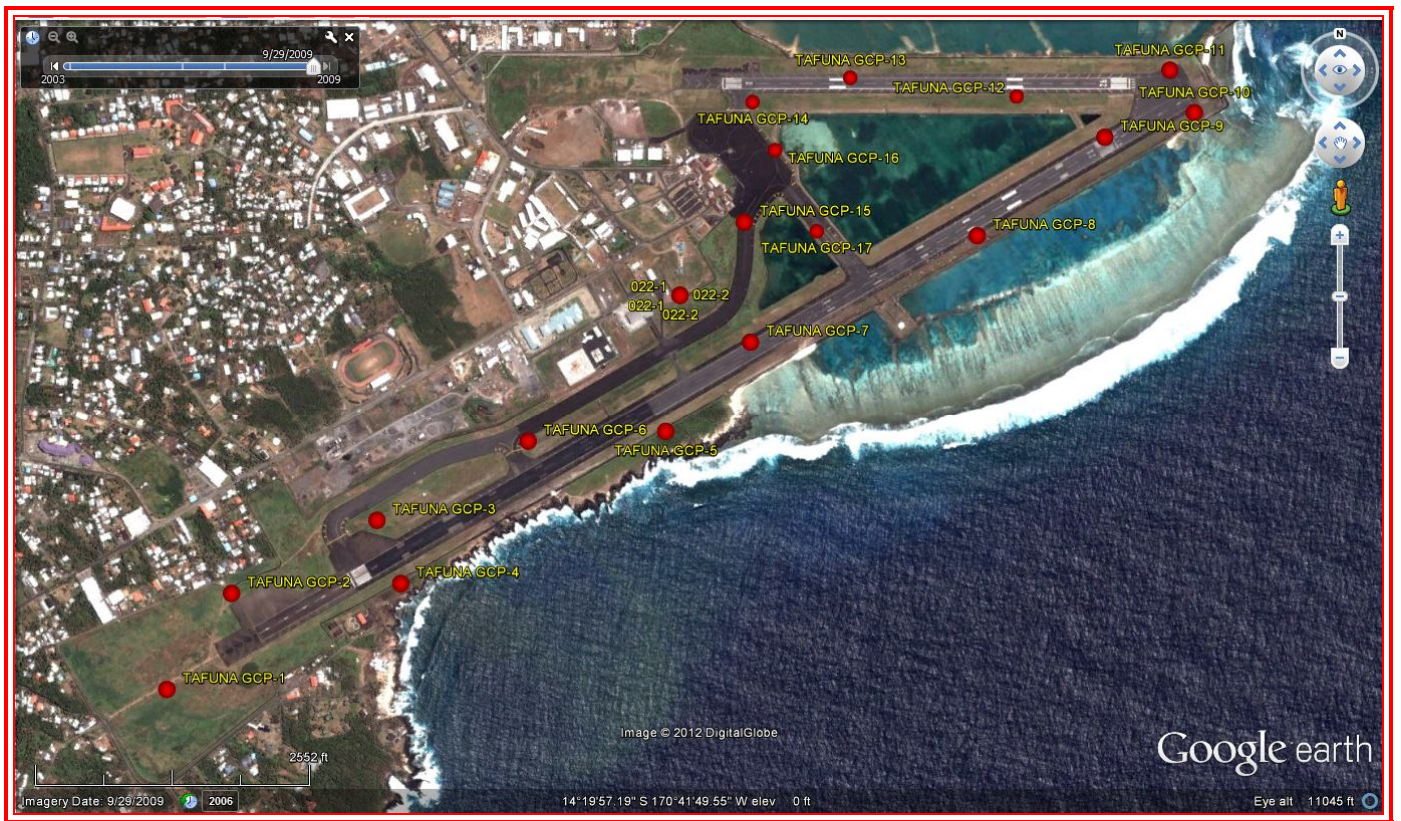
MARKER DESCRIPTION: PK NAIL SET FLUSH WITH THE GROUND  
FABRIC TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED BETWEEN RUNWAY #5 AND THE TAXIWAY  
IT'S SOUTHEAST OF ASPA SOLAR PANEL FARM.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-3

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: TAFUNA GCP-4

ANTENNA HEIGHT: 2M

START TIME: 1:05PM

STOP TIME: 1:41PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

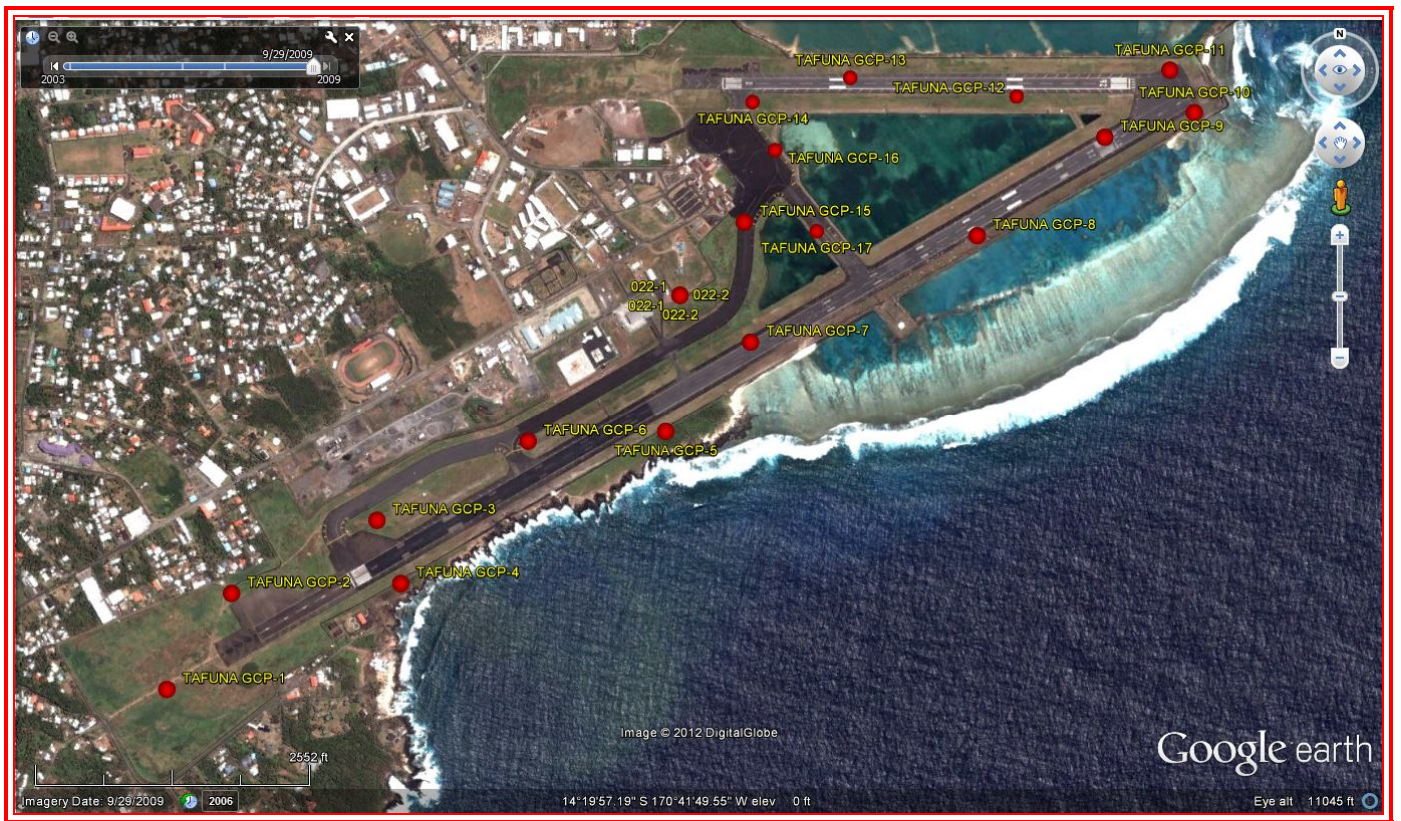
MARKER DESCRIPTION: PK NAIL SET FLUSH WITH THE GROUND  
PAINTED TARGET

LOCATION: MARK IS LOCATED SOUTH OF RUNWAY #5 AND IT'S  
NORTHEAST OF FOGAGOGO WWTP.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-4



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: TAFUNA GCP-5

ANTENNA HEIGHT: 2M

START TIME: 1:47PM

STOP TIME: 2:27PM

LATITUDE: NA +/-

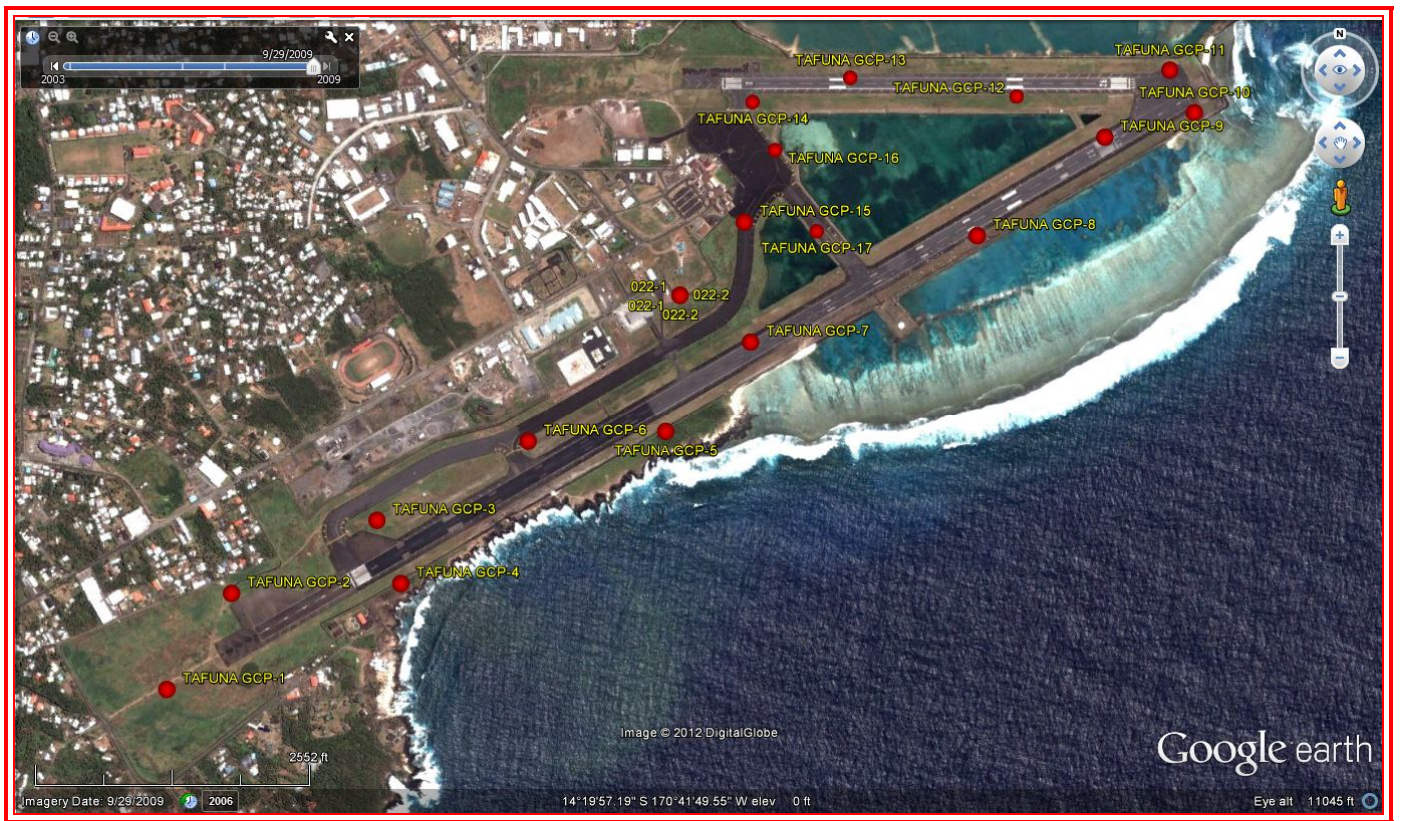
LONGITUDE: NA +/-

MARKER DESCRIPTION: PK NAIL SET FLUSH WITH THE GROUND  
PAINTED TARGET.

LOCATION: MARK IS LOCATED ON THE SOUTH SIDE OF RUNWAY #5  
AND SOUTH OF AIRPORT FIRE CRASH BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-5

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: TAFUNA GCP-6

ANTENNA HEIGHT: 2M

START TIME: 12:39PM

STOP TIME: 1:40PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

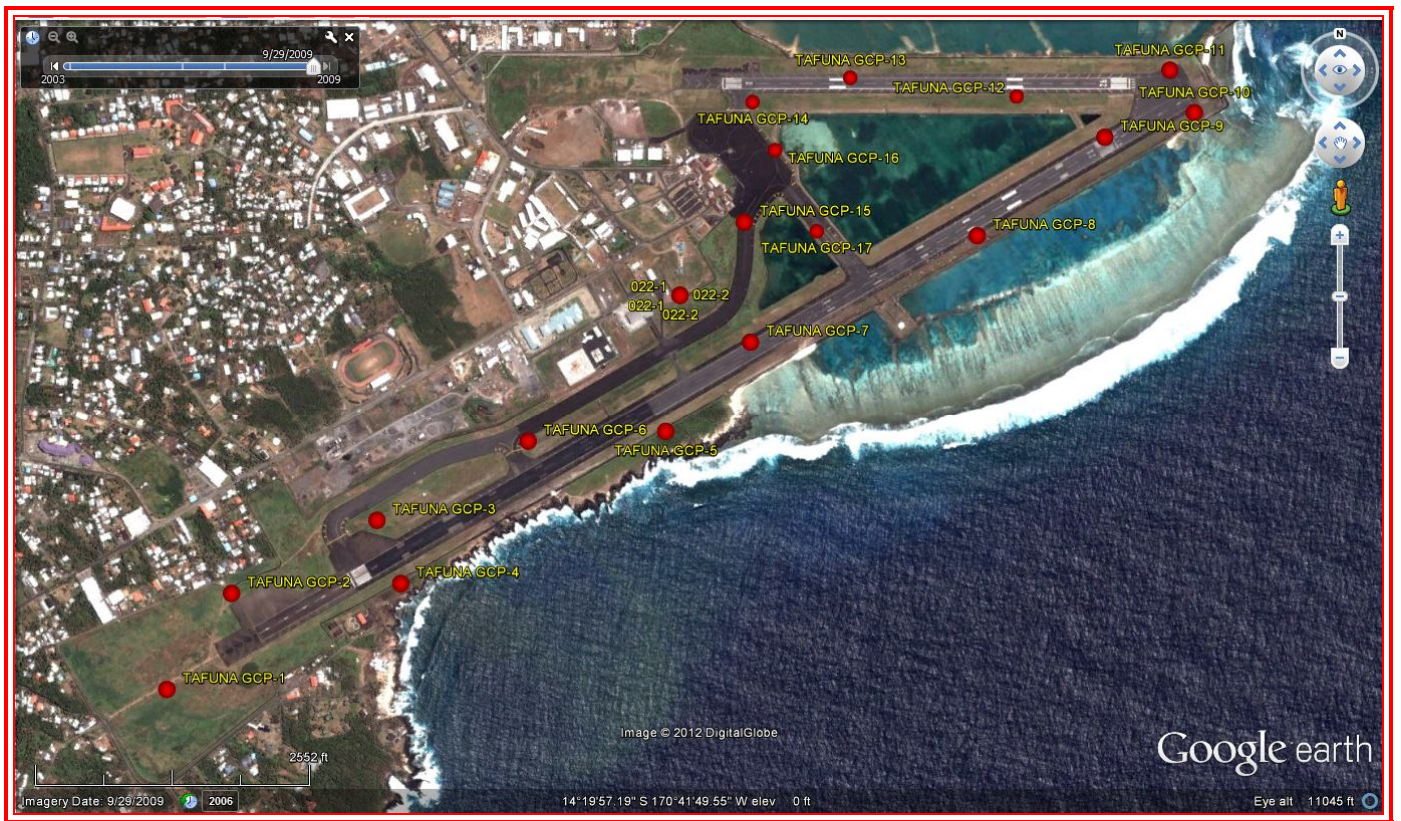
MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #5 PAINTED LINES.

LOCATION: MARK IS LOCATED BETWEEN RUNWAY #5 AND TAXIWAY

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-6



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: TAFUNA GCP-7

ANTENNA HEIGHT: 2M

START TIME: 2:33PM

STOP TIME: 3:11PM

LATITUDE: NA +/-

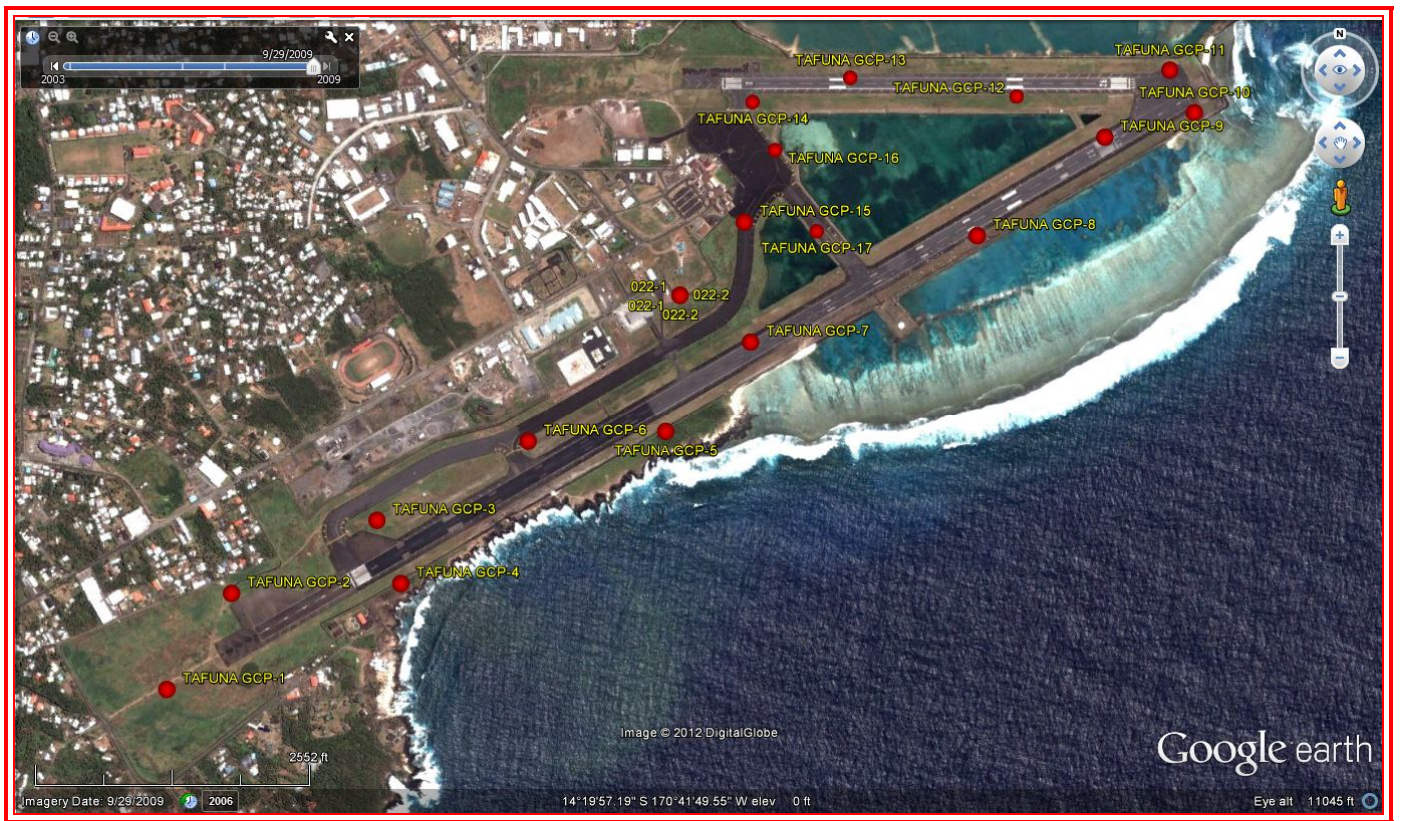
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #5 PAINTED LINES.

LOCATION: MARK IS LOCATED ON THE NORTH SIDE OF RUNWAY #5  
AND IT' S SOUTHEAST OF BM 022

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-7

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: TAFUNA GCP-8

ANTENNA HEIGHT: 2M

START TIME: 2:40PM

STOP TIME: 3:21PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

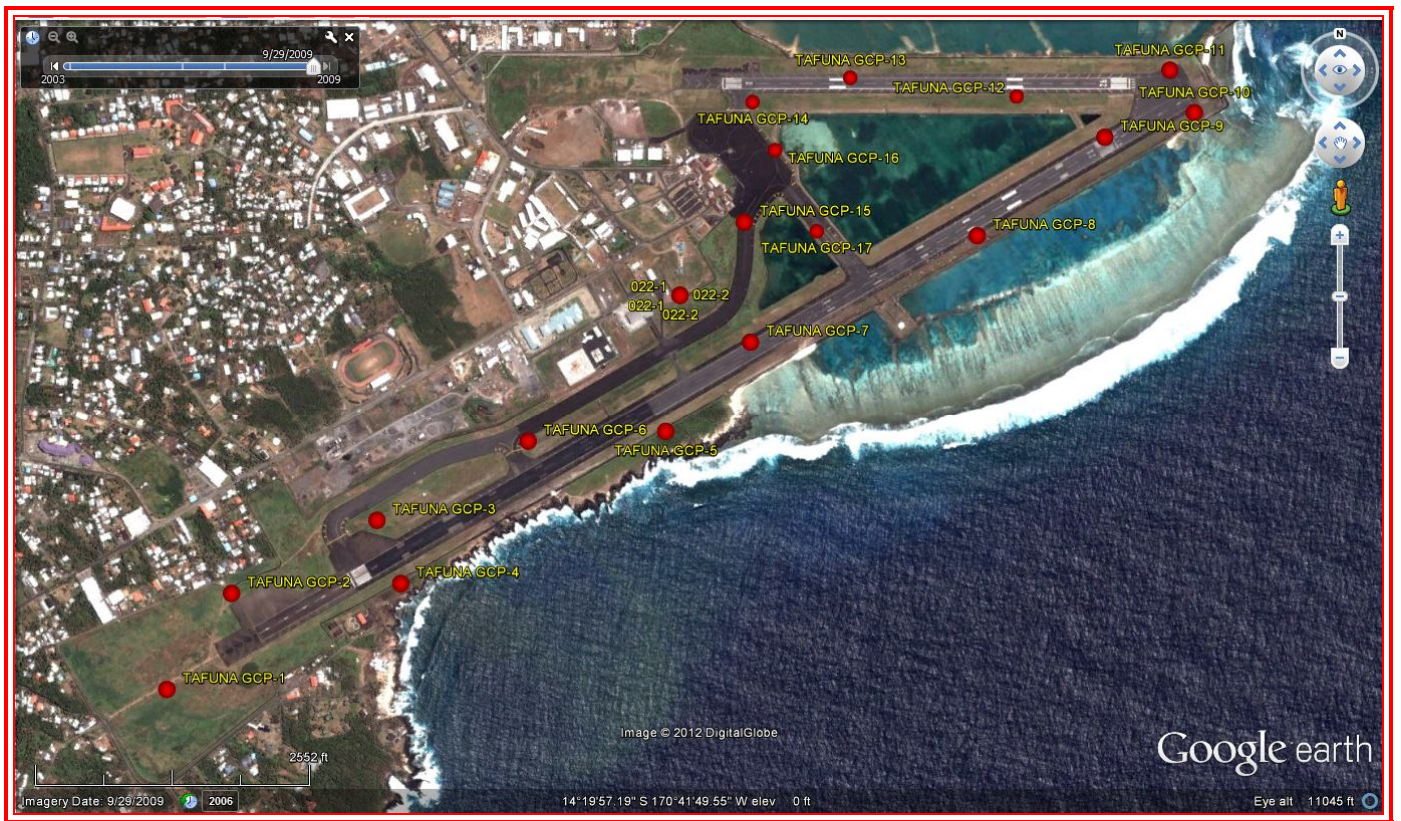
MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #5 PAINTED LINES.

LOCATION: MARK IS LOCATED SOUTH OF RUNWAY #5

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-8



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: TAFUNA GCP-9

ANTENNA HEIGHT: 2M

START TIME: 3:27PM

STOP TIME: 4:02PM

LATITUDE: NA +/-

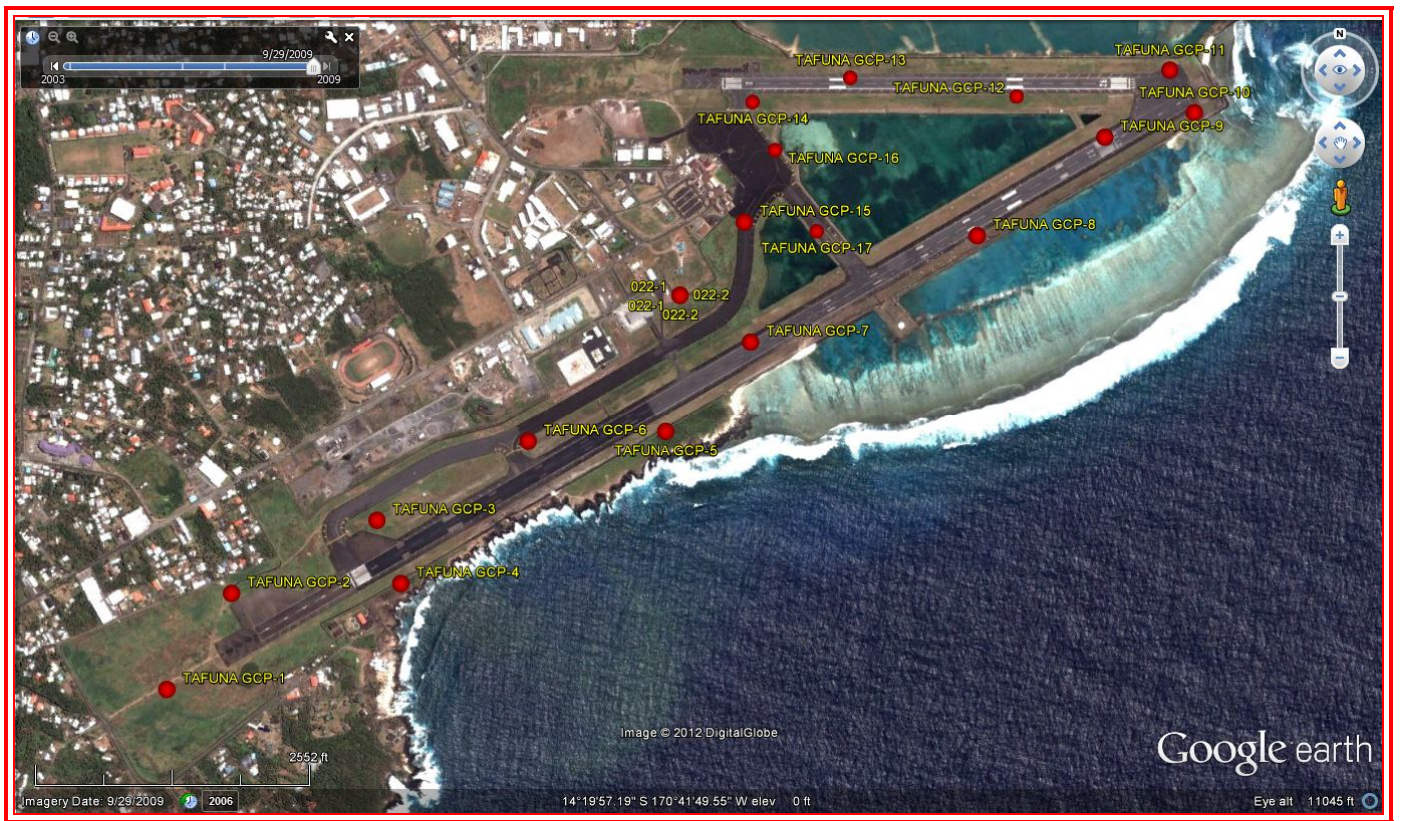
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #5 PAINTED LINES.

LOCATION: MARK IS LOCATED ON THE NORTH SIDE OF RUNWAY #5.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-9

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT# TAFUNA GCP-10

ANTENNA HEIGHT: 2M

START TIME: 3:32PM

STOP TIME: 4:10PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

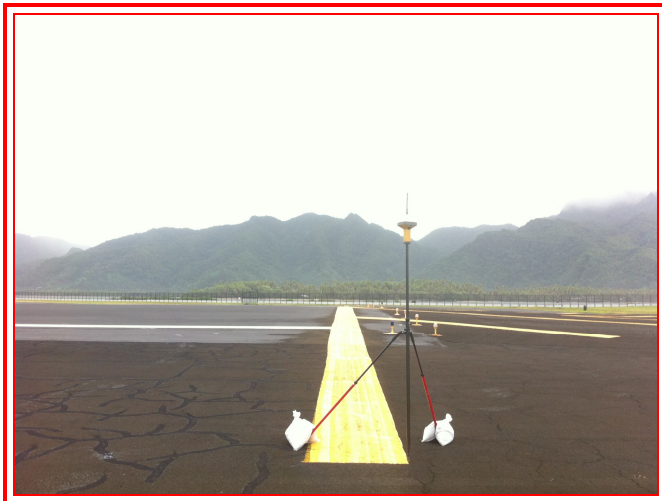
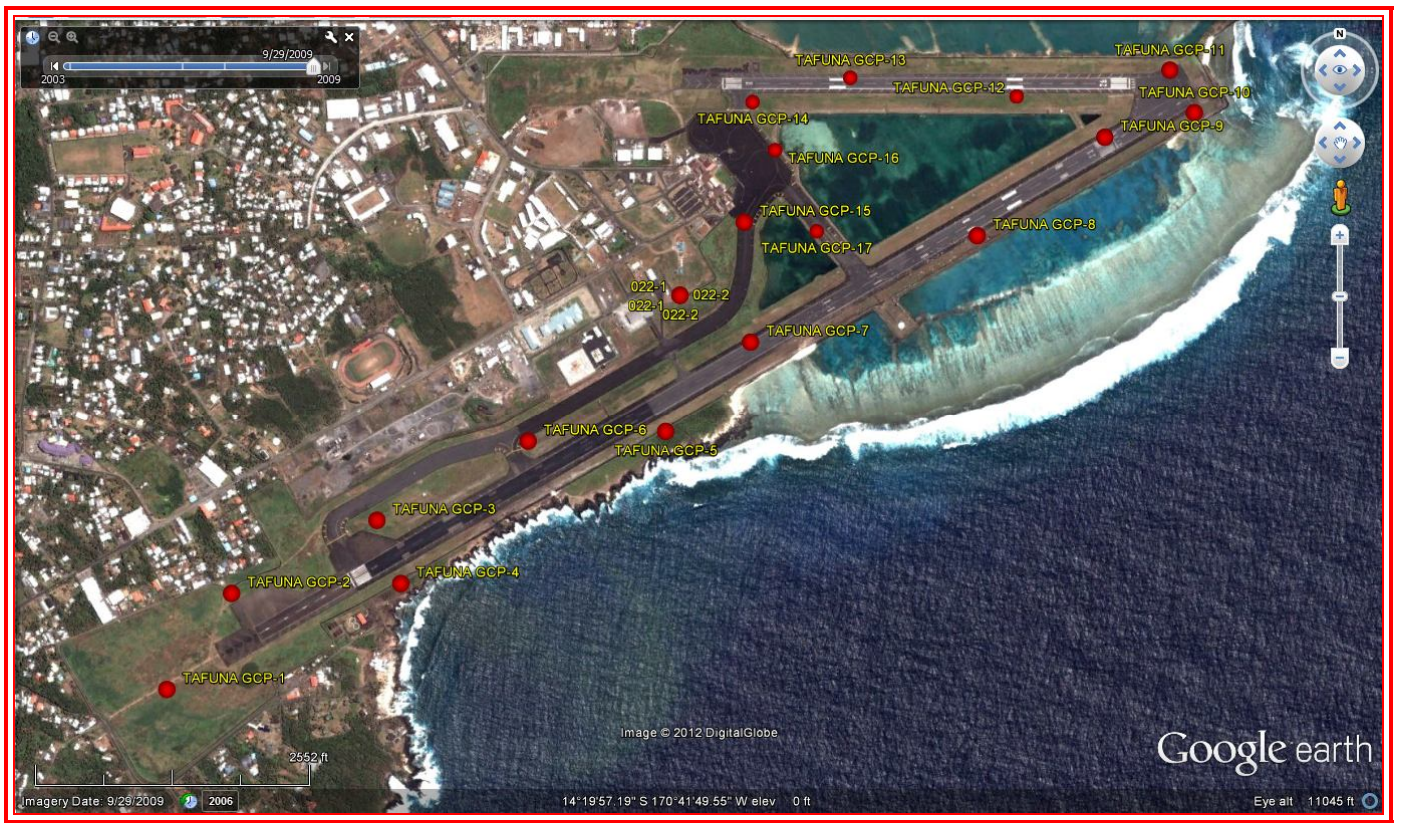
MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY PAINTED LINES.

LOCATION: MARK IS LOCATED ON THE SOUTH SIDE OF RUNWAY #5

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-10



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT# TAFUNA GCP-11

ANTENNA HEIGHT: 2M

START TIME: 8:41PM

STOP TIME: 9:21PM

LATITUDE: NA +/-

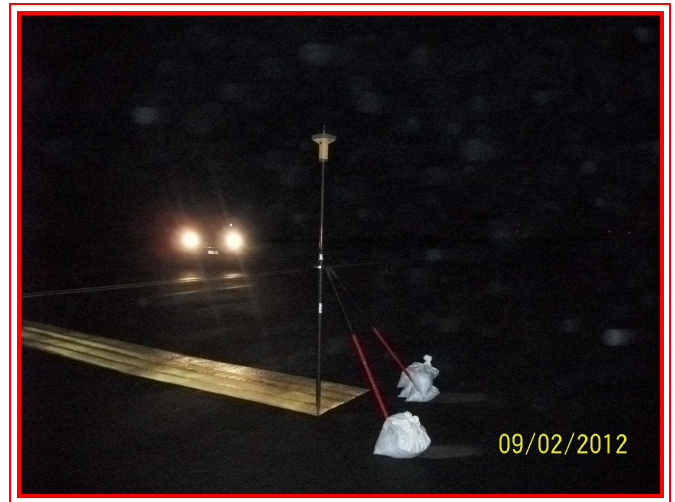
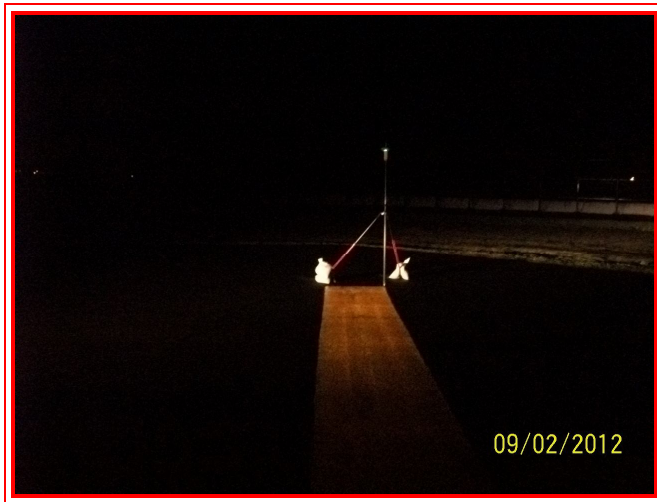
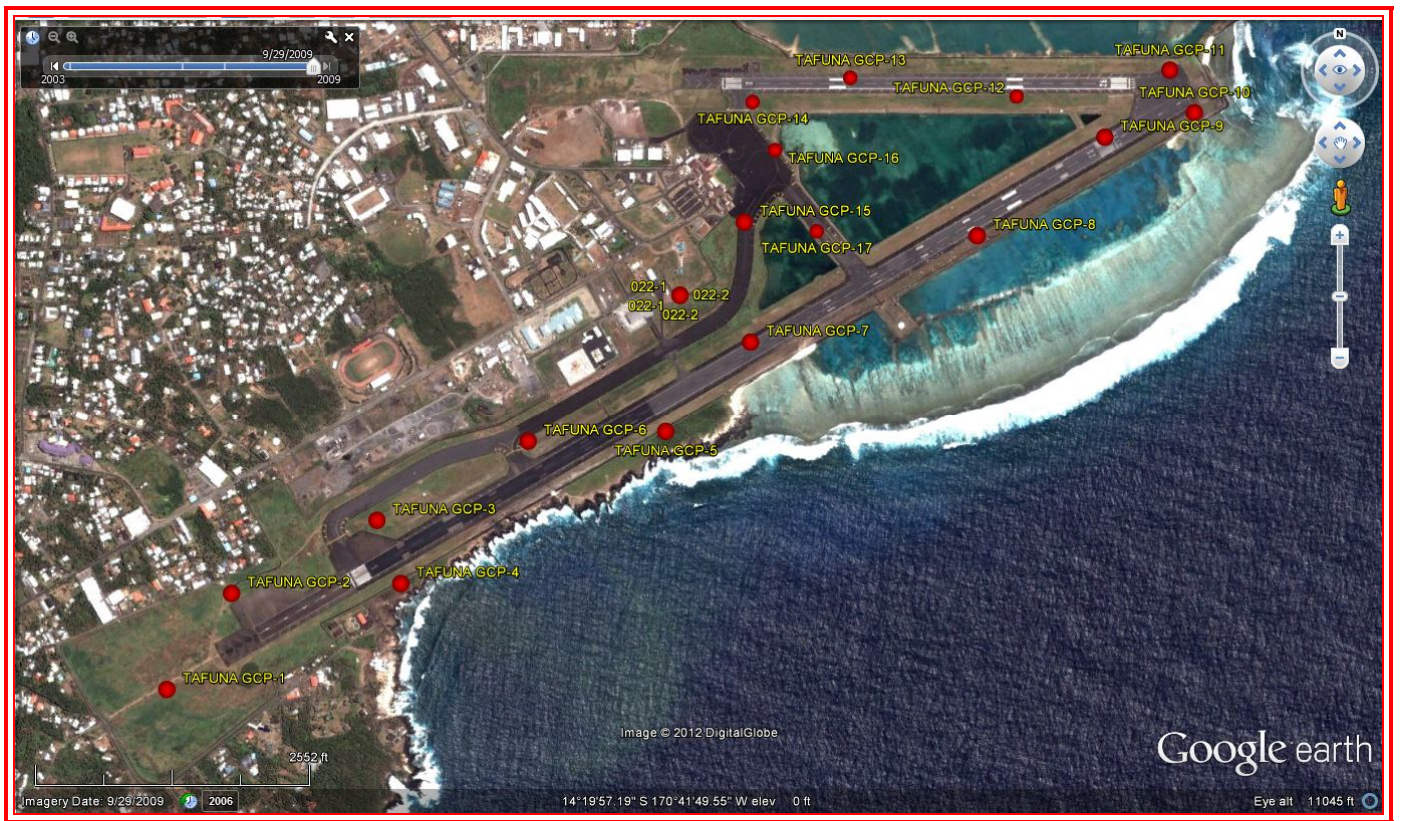
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY PAINTED LINES.

LOCATION: MARK IS LOCATED ON THE NORTHEAST END OF RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-11

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT# TAFUNA GCP-12

ANTENNA HEIGHT: 2M

START TIME: 5:14PM

STOP TIME: 5:58PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

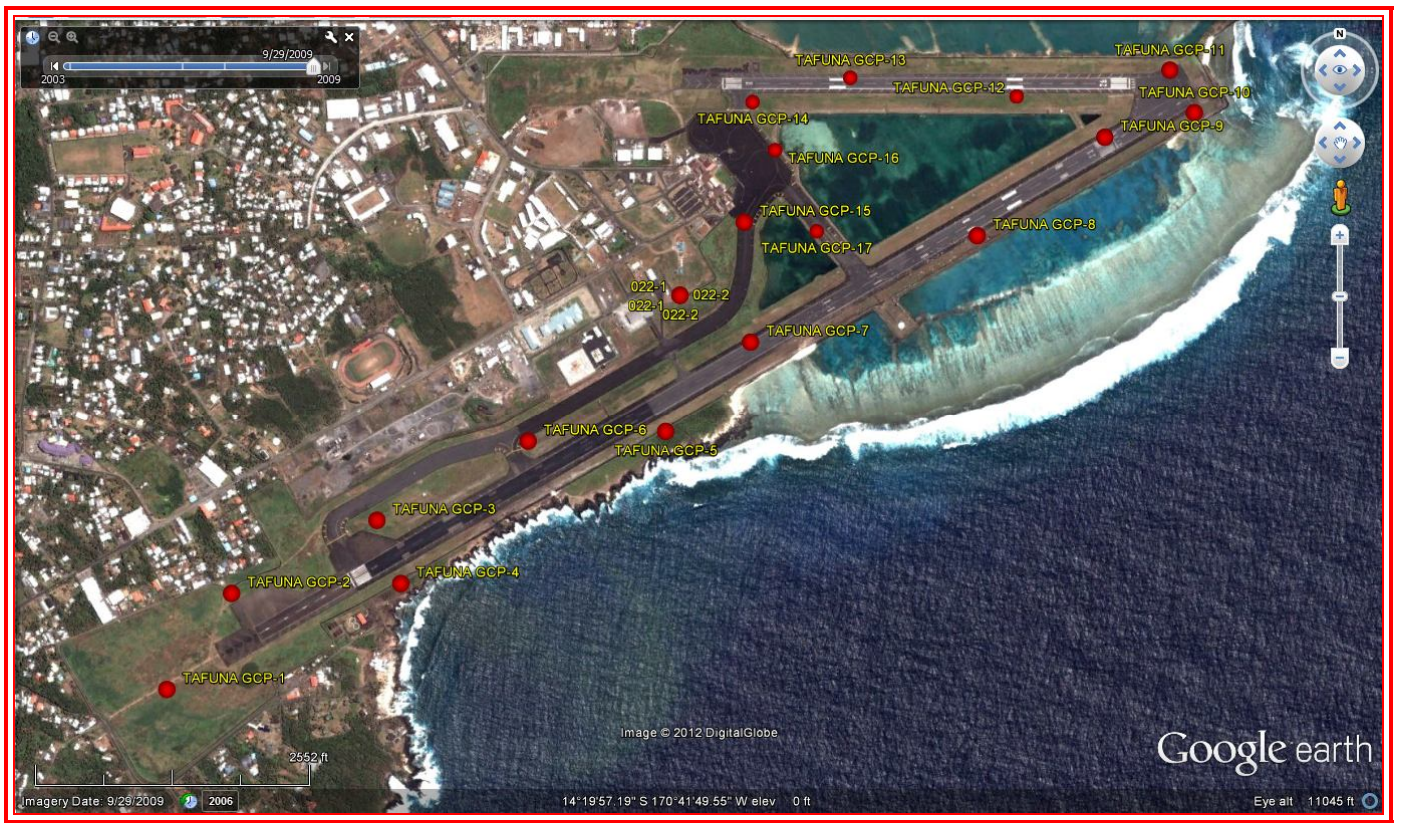
MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #8 PAINTED LINES.

LOCATION: MARK IS LOCATED SOUTH OF RUNWAY #8.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAFUNA GCP-12



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT# TAFUNA GCP-13

ANTENNA HEIGHT: 2M

START TIME: 5:11PM

STOP TIME: 5:40PM

LATITUDE: NA +/-

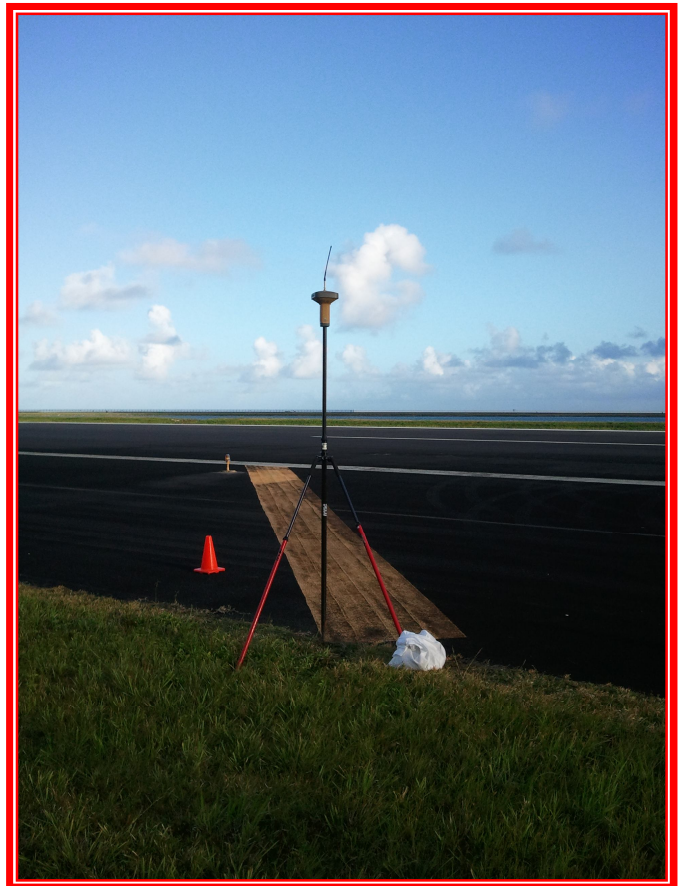
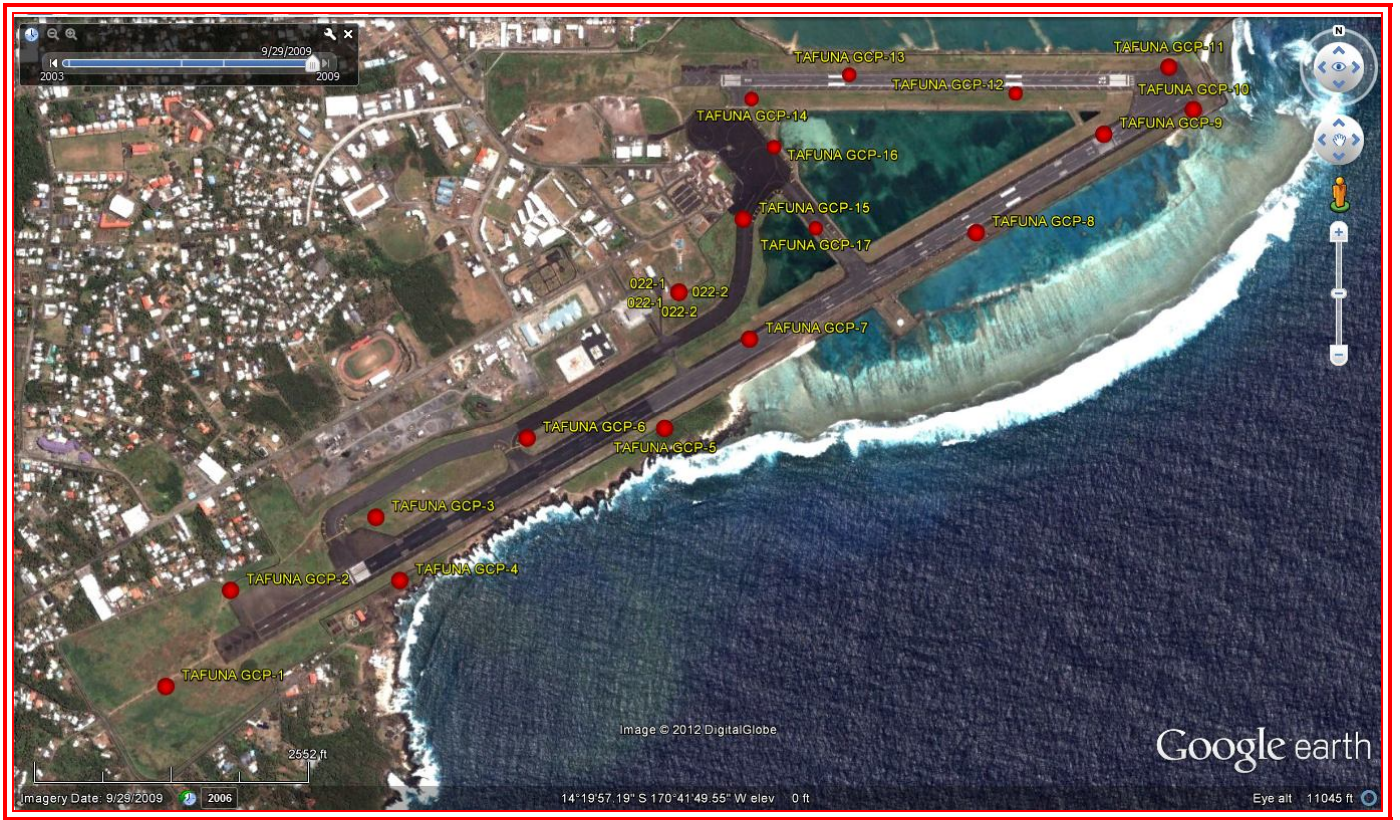
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #8 PAINTED LINES.

LOCATION: MARK IS LOCATED NORTH OF RUNWAY #8.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-13



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TAMILO, TAI

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT# TAFUNA GCP-14

ANTENNA HEIGHT: 2M

START TIME: 5:44PM

STOP TIME: 6:14PM

LATITUDE: NA +/-

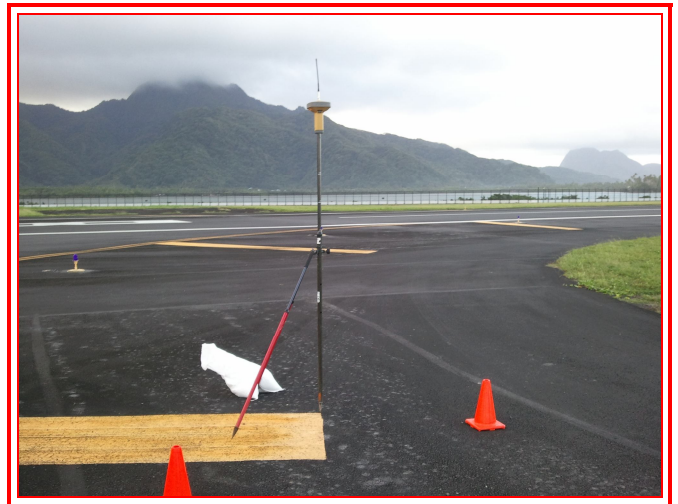
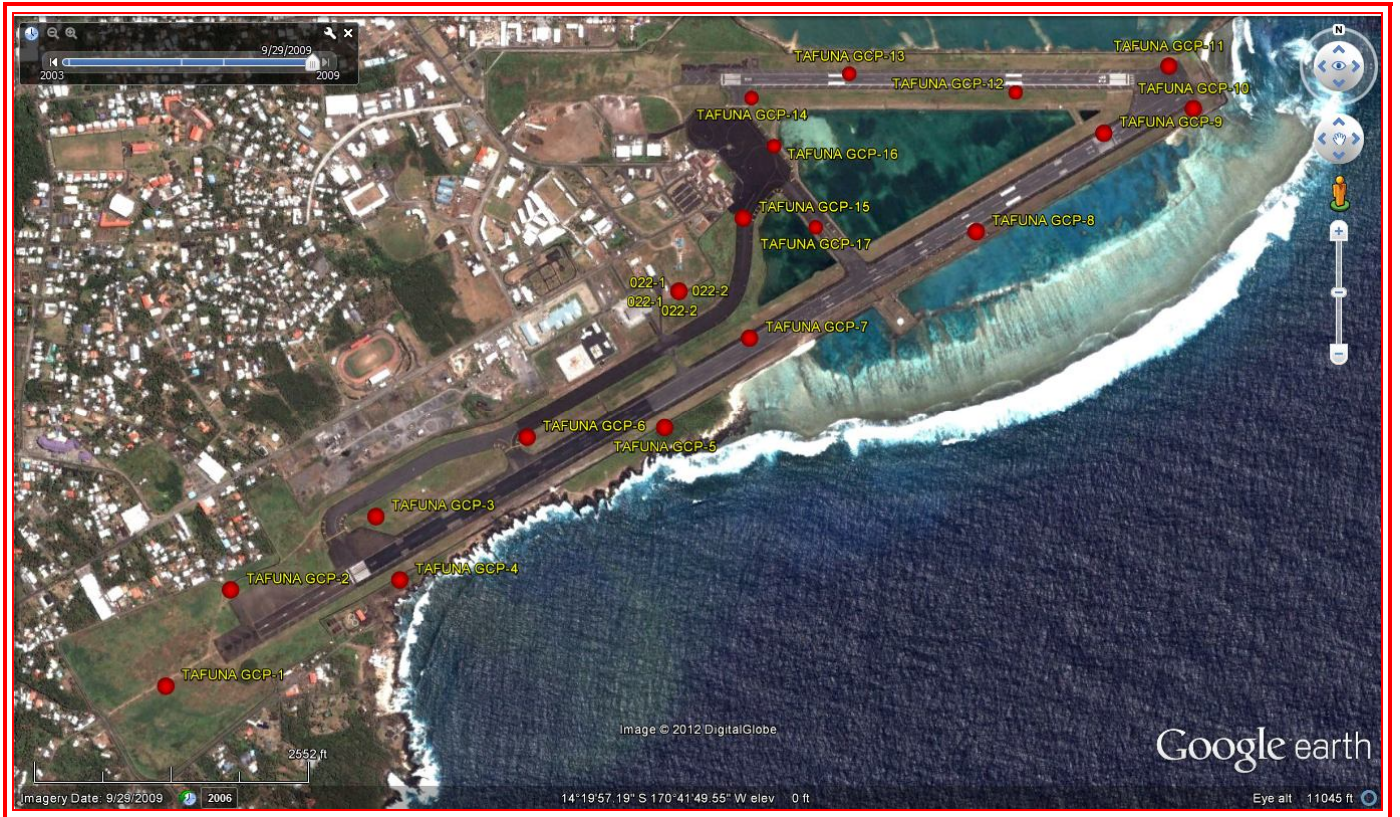
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #8 PAINTED LINES.

LOCATION: MARK IS LOCATED SOUTH OF RUNWAY #8

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-14



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT# TAFUNA GCP-15

ANTENNA HEIGHT: 2M

START TIME: 10:18PM

STOP TIME: 11:05PM

LATITUDE: NA +/-

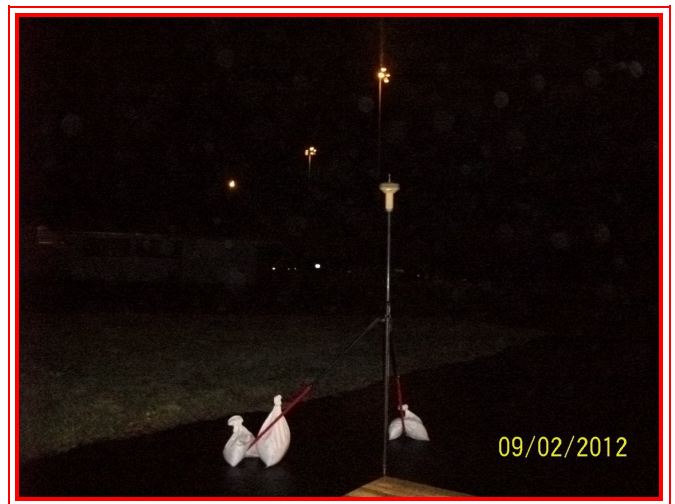
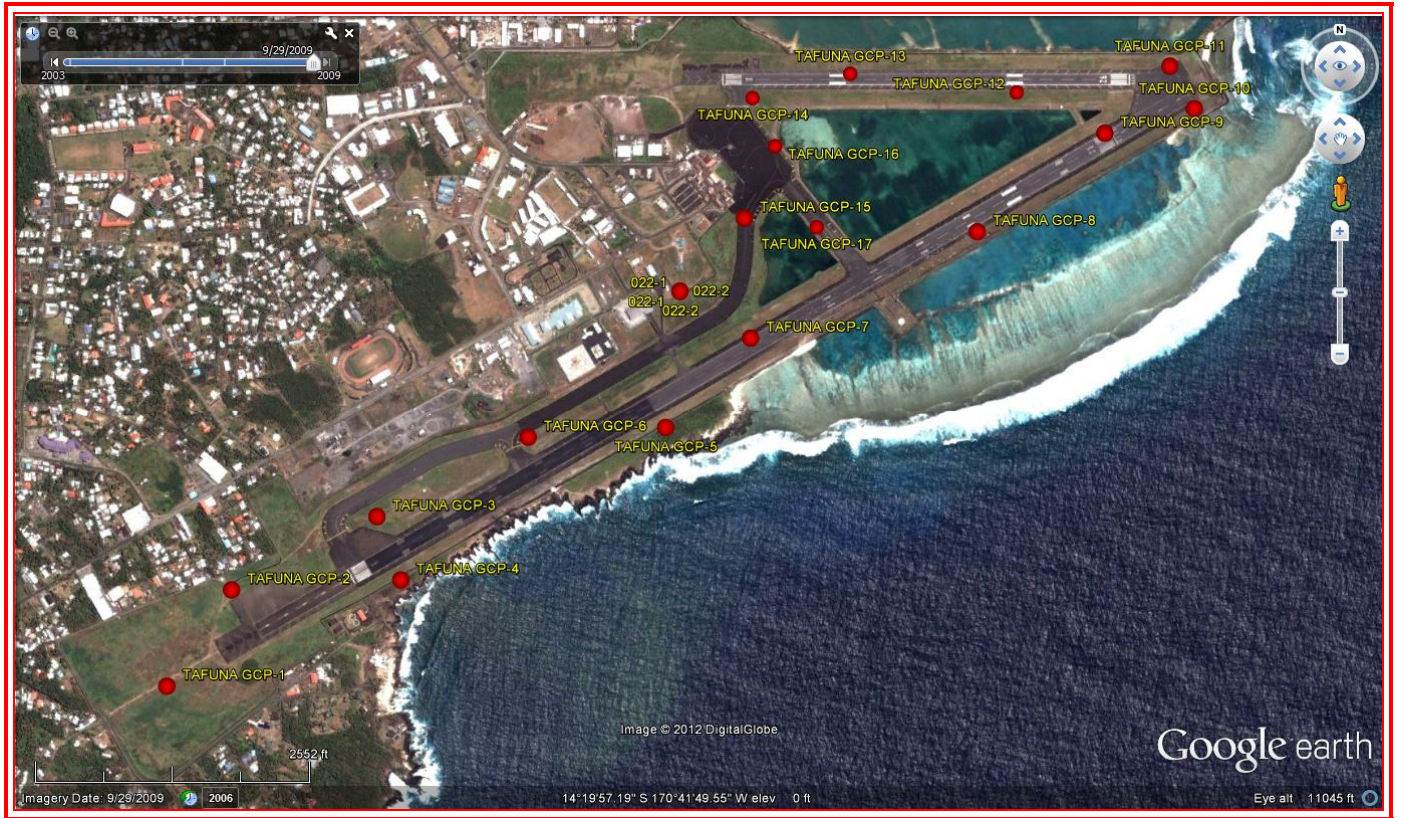
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY #8 PAINTED LINES.

LOCATION: MARK IS LOCATED SOUTH OF RUNWAY #8.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



## TAFUNA GCP-15

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: WEI, GALEN

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT# TAFUNA GCP-16

ANTENNA HEIGHT: 2M

START TIME: 6:04PM

STOP TIME: 6:51PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

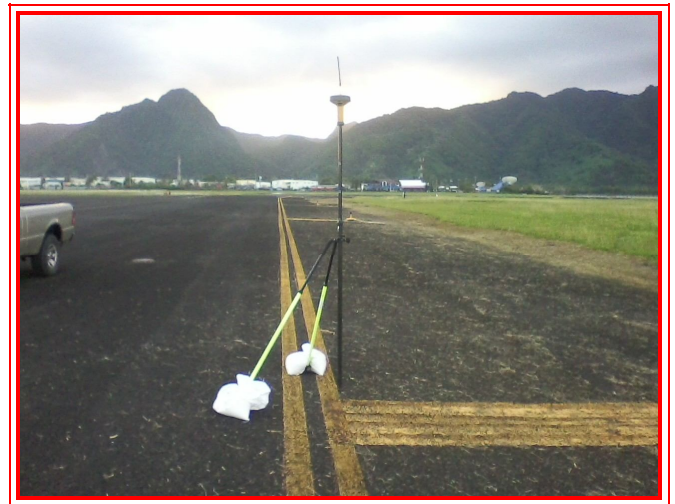
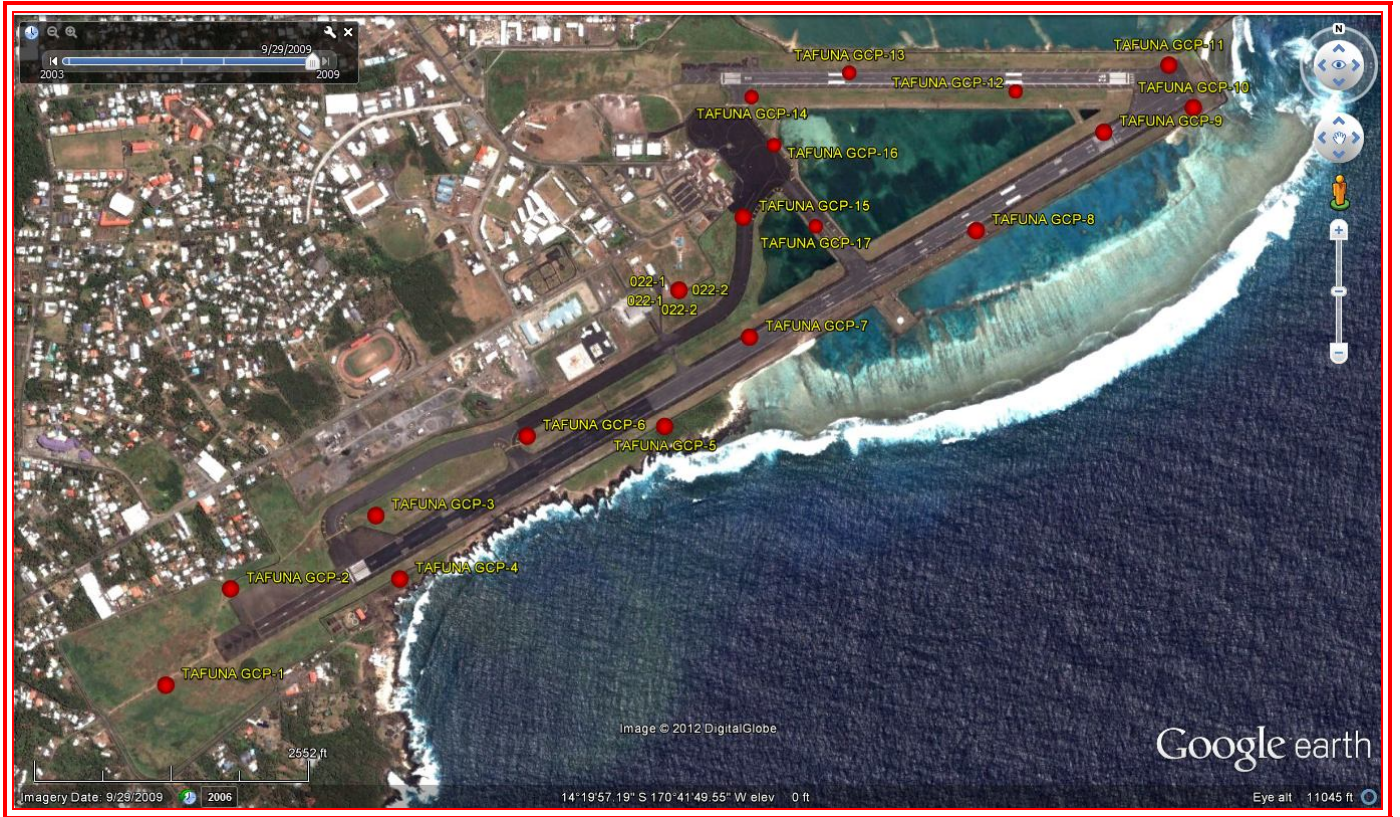
MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY PAINTED LINES.

LOCATION: MARK IS LOCATED NORTHEAST OF THE AIRPORT  
TERMINAL BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





## TAFUNA GCP-16



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TAI, TAMILO

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT# TAFUNA GCP-17

ANTENNA HEIGHT: 2M

START TIME: 6:19PM

STOP TIME: 6:50PM

LATITUDE: NA +/-

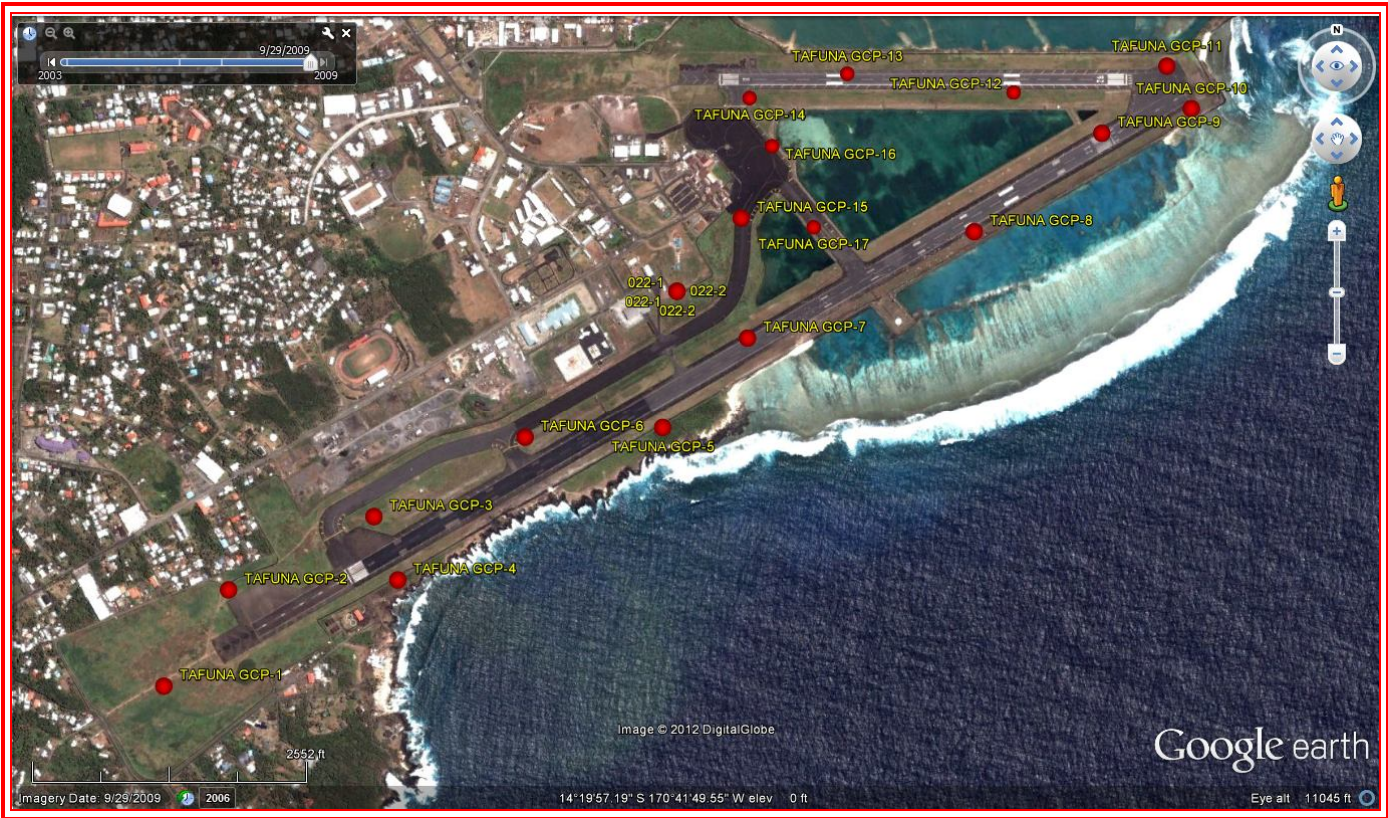
LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF RUNWAY PAINTED LINES.

LOCATION: MARK IS LOCATED SOUTHEAST OF THE AIRPORT  
TERMINAL BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAFUNA GCP-17

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/3/12

PROJECT: PHASE-3 GCP SET-2

OPERATOR: TOMA, TAMILO

COUNTY: SAOLE

VILLAGE: AUNUU

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: AUNUU GCP-1

ANTENNA HEIGHT: 2M

START TIME: 12:34PM

STOP TIME: 1:16PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF BALL COURT

LOCATION: MARK IS LOCATED ON THE EAST CORNER OF THE LDS CHURCH BASKETBALL COURT.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





AUNUU GCP-1



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: WEI, GALEN

COUNTY: SAOLE

VILLAGE: AUNUU

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: AUNUU GCP-2

ANTENNA HEIGHT: 2M

START TIME: 12:38PM

STOP TIME: 1:09PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF HOUSE FOUNDATION.

LOCATION: MARK IS LOCATED ON THE SOUTEAST CORNER OF  
A HOUSE FOUNDATION.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



AUNUU GCP-2

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/3/12

PROJECT: PHASE-3 GCP SET-2

OPERATOR: GALEN, WEI

COUNTY: SAOLE

VILLAGE: AUNUU

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: AUNUU GCP-3

ANTENNA HEIGHT: 2M

START TIME: 1:31PM

STOP TIME: 2:10PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CORNER OF CONCRETE SLAB

LOCATION: MARK IS LOCATED ON THE NORTHEAST CORNER OF A  
CONCRETE SLAB USE FOR CRICKET GAMES.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





AUNUU GCP-3



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TAI,TAMILO

COUNTY: VAIFANUA

VILLAGE: AOA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: AOA GCP

ANTENNA HEIGHT: 2M

START TIME: 1:23PM

STOP TIME: 1:55PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: OUTSIDE PAINT STRIPE ON A BALL COURT.

LOCATION: MARK IS LOCATED ON THE WEST SIDE OF THE CCCJS BASKETBALL COURT AND IT'S SOUTH OF THE CHURCH BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



AOA GCP

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/19/12

PROJECT: PHASE-3 GCP SET-4

OPERATOR: TAI,TAMILO

COUNTY: VAIFANUA

VILLAGE: ALAO

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: ALAO GCP

ANTENNA HEIGHT: 2M

START TIME: 10:54PM

STOP TIME: 11:29PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: INSIDE CORNER OF PAVEMENT CHANGE ON BRIDGE.

LOCATION: MARK IS LOCATED ON THE NORTHEAST PORTION  
OF ALAO BRIDGE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





ALAO GCP



# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: WEI, GALEN

COUNTY: VAIFANUA

VILLAGE: TULA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: TULA GCP

ANTENNA HEIGHT: 2M

START TIME: 12:24PM

STOP TIME: 1:01PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: INSIDE CORNER OF PAINT STRIPES ON COURT-LOT.

LOCATION: MARK IS LOCATED SOUTHEAST OF AOG CHURCH BUILDING AND SOUTHWEST OF CCCJS CHURCH BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TULA GCP

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P8ELL1T7T34

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 10:24AM

STOP TIME: 4:50PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : P87ZRUPHQ80      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M

START TIME: 10:20AM

STOP TIME: 4:22PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P8ELL1T7T34

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 8:43PM

STOP TIME: 11:19PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/2/12

PROJECT: PHASE-3 GCP SET-1

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : P87ZRUPHQ80      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M

START TIME: 8:24PM

STOP TIME: 11:35PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/3/12

PROJECT: PHASE-3 GCP SET-2

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P87ZRUPHQ80

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 10:47AM

STOP TIME: 2:16PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/3/12

PROJECT: PHASE-3 GCP SET-2

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : P8ELL1T7T34      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M

START TIME: 10:49AM

STOP TIME: 2:16PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P87ZRUPHQ80

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 10:11AM

STOP TIME: 4:02PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : P8ELL1T7T34      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M      START TIME: 10:29AM      STOP TIME: 4:01PM

LATITUDE: NA +/-      LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P87ZRUPHQ80

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 4:46PM

STOP TIME: 6:56PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/18/12

PROJECT: PHASE-3 GCP SET-3

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : P8ELL1T7T34      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M

START TIME: 4:36PM

STOP TIME: 6:58PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/19/12

PROJECT: PHASE-3 GCP SET-4

OPERATOR: TOMA, SAM

COUNTY: TUALAUTA

VILLAGE: TAFUNA

ANTENNA TYPE: GR3

RECEIVER SN : P87ZRUPHQ80

PT#: BASE-1 (022)

ANTENNA HEIGHT: 2M

START TIME: 10:19AM

STOP TIME: 1:42PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON THE TAFUNA WEATHER STATION

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/19/12

PROJECT: PHASE-3 GCP SET-4

OPERATOR: SAM

COUNTY: TUALAUTA

VILLAGE: MALAEIMI

ANTENNA TYPE: GR3      RECEIVER SN : R8LCQJKQ5TS      PT#: BASE-2 (ASCC-44A)

ANTENNA HEIGHT: 2M

START TIME: 10:35AM

STOP TIME: 1:14PM

LATITUDE: NA +/-

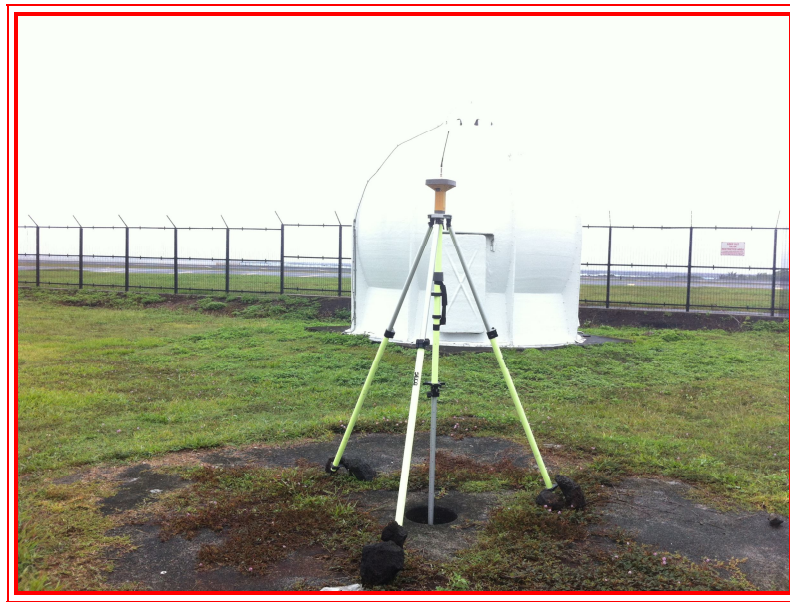
LONGITUDE: NA +/-

MARKER DESCRIPTION: NGS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED ON ASCC CAMPUS, INFRONT OF A SAMOAN GUEST HOUSE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



BASE-1 (SATELLITE TRIANG STATION 022)



BASE-2 (ASCC AS-44A)

# MANU'A ISLANDS

## GROUND CONTROL POINTS SURVEY

PHOTO SCIENCE: Project #7525-055 & #7505-068

# 2012



# THE MANU'A ISLANDS



Presented by :

**POB MAPPING SERVICES**  
**NU'UULI, PAGO PAGO**  
**AMERICAN SAMOA 96799**



**PROJECT: AMERICAN SAMOA IMAGERY  
AND LIDAR ACQUISITION GCP COLLECTION**

**LOCATION: AMERICAN SAMOA  
MANU'A ISLANDS ( OFU, OLOSEGA AND TAU )**

**MAIN CONTRACTOR: PHOTO SCIENCE INC.**

**SURVEY SUB-CONSULTANT: POB MAPPING SERVICES**

Table of Contents

- I. Survey Summary Report
- II. Equipment Specifications
- III. NGS Network Data Sheets
- IV. Final GCP's Coordinates Summary
- V. GCP's Adjustment Statistics and Report
- VI. Data Log Sheets with Photographs

I.

JULY 16, 2012.

## SURVEY SUMMARY REPORT

**POB Mapping Services was contracted by Photo Science Inc to establish and survey 40 ground control points (GCP's), to support the Aerial Topographical LIDAR data and High Resolution Aerial Imagery on the Islands of Manu'a which were Ofu, Tau and Olosega in American Samoa.**

**Field survey was conducted from May 31<sup>st</sup> 2012 through June 15<sup>th</sup> 2012 by ten POB Mapping Services survey crew. Horizontal controls were established by using Rapid Static GPS method and adjusted to NGS control network dated 6-27-2012. Each control points were occupy and observe for one hour or more and were referencing to two known base station control points. Vertical controls were established by using differential leveling method (three wire reading) due to poor GPS elevations. Real Time Kinematic (RTK) method was also used on Tau Airport GCP due to the availability and getting access into the runway plus the safety of the survey crew. All points were post process and check to meet its accuracies (95% confidence level) as stated in the SOW.**

**Ground Control Points throughout the Manua project were either set with a 2" brass caps flush with the ground, a 5/8" rebar's driven flush with the ground, PK nails or existing survey markers and existing paint stripes especially on the two airports in Ofu and Fitiuta.**

**All survey panels were based on the paneling guidelines provide with the SOW. The Chevron shape was use throughout the entire project either by painting on existing hard surface or by laying the Chevron shape that was cut out of a heavy duty tarp material which was attached to a wooden frame or template with the same specify dimension.**

**POB Mapping Services Utilize five TOPCON GR-3 GPS survey grade receivers for Rapid Static and RTK data collections. Two TOPCON AT-G2 and a SOKKIA B20 automatic levels with 25 foot long fiberglass rods graduated in feet and tenths where use for differential leveling. Topcon Tools V.8 was the post processing software for Static GPS and RTK survey calculations.**

**All GCP points were documented with field photos showing the GPS set-up during data collections and field notes for differential leveling loops. Attached maps show GCP's approximate location and direction where each target were pointing by referencing to true north. These are the 40 points that will be used for LIDAR calibration, imagery control and imagery accuracy.**

**Final GCP's are deliver in Universal Transverse Mercator (UTM), Zone\_2 South Projection with Horizontal Datum ( NAD83 ) as stated in the SOW. The main NGS Horizontal Control Points for Ofu, Olosega and Sili are "OFU C" and "OLOSEGA ET". Two other points were calculated off the two NGS points which are "TOM" and "OFU BRIDGE". These two points were also used as base stations throughout the project. All GCP's elevations for Ofu, Olosega and Sili are based on differential leveling method. OFU C Orthometric Height of 3.3 meters or 10.83 feet was the set bench mark elevation. Horizontal Control Points for Tau were "TAU C" and "TIDE GAGE ET". All GCP's elevations for Tau are based on differential leveling method. TAU ET leveling elevations of 0.59 meters or 1.94 feet was the set bench mark elevation.**

## Main Control Points

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Description
OFU-C	14°11'02.08718"S	169°40'22.13391"W	8431527.154461	643220.374731	3.30	NOS SURVEY DISK
OLOSEGA ET	14°10'55.26933"S	169°37'17.35988"W	8431704.604538	648761.289286	1.862332	USGS DISK
OFU BRIDGE	14°10'08.08409"S	169°37'54.67470"W	8433161.133320	647651.022774	5.386	2' ALUMINUM CAP SET IN CONCRETE
TOM	14°09'45.04076"S	169°40'54.10560"W	8433900.098016	642275.187901	3.849797	2" BRASS DISK SET IN CONCRETE SEAWALL
TAU-C	14°12'58.90124"S	169°25'21.38936"W	8427769.492892	670202.230312	32.461265	NOS SURVEY DISK
TIDE GAGE ET	14°14'28.28498"S	169°30'34.71342"W	8425084.444773	660791.624826	2.673101	USGS DISK



**MAP SHOW MAIN CONTROL POINTS FOR THE MANUA ISLANDS**



# II. Equipment Specifications for GPS receivers and Automatic Level

## The Leader in Positioning Technology...

Your authorized Topcon dealer has the answer for all of your precise positioning needs. Whether you're looking for precision GPS+ control for surveying and engineering applications or layout and grade management on a construction job site, your local Topcon dealer offers the widest range of products to get the job done quickly and accurately.

And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an indicate-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or ag/land leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

## The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

## Offices Worldwide

**TOPCON CORPORATION**  
7911 Hexemerech, Mableton - 30158 GA USA, Legon  
Phone: 770.932.0200 Fax: 770.932.0200

**Topcon Europe Positioning B.V.**  
Eindhoven 11, 20081 Li Capelle 40 (Bel) • THE NETHERLANDS  
Phone: 0031-40-20771-1 Fax: 0031-40-20771-2000

**Topcon Corporation Beijing Office**  
Block A No. 5, Keping Street, Beijing Economic  
Technological Development Area, Beijing 100070 • CHINA  
Tel: +86-10-6102770 Fax: +86-10-6102770



**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
www.topconpositioning.com

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## Basic Specifications

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signals Tracked:	L1 L2, & L5 carrier, CA, L1 P, L2 P, L2C
GPS	L1 L2, & L5 carrier, L1CA, L2CA, L1 P, L2 P
GLONASS	E2 L1 E1, E5, E6
GALILEO	
WAAS/EGNOS	Yes
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real time RTK accuracy	H: 10mm+1ppm V: 15mm+1ppm
Post processed Static DGPS	H: +5.0mm+0.5ppm V: +5.0mm+0.5ppm
<b>COMMUNICATIONS</b>	
Optional Radio Type	Integrated Tx/Rx 915MHz Spread Spectrum
Base Radio Output	0.250 - 1.0 Watts, selectable
Cellular Communications	Integrated GSM/GPRS/GSM/GPS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update/Output Rate	1 - 20Hz, Selectable
Real Time Data Output	TPS, RTCM SCOR, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External, Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium I-Beam Housing
Operating Temperature	-20 to +50C with batteries
Environmental Specification	IP66 waterproof/dustproof
Shock Rating	2 meter pole drop

## The Leader in Positioning Technology...

Topcon Positioning Systems is the worldwide leading developer and manufacturer of precision positioning equipment and offers the widest selection of innovative precision GPS systems, laser, optical surveying, and machine control products.

From open-field construction projects to isolated surveying sites and from rolling farmland to inner city utility projects, Topcon Positioning Systems provides innovative technology that provides a decidedly competitive edge to end-users.

The recognized innovative trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands facing construction, surveying, agriculture, utilities and law enforcement industries worldwide.



Your local Authorized Topcon dealer is:

## GR-3



## G3 ENABLED GNSS RECEIVER



### Advanced GPS+ Technology

- G3 SATELLITE TRACKING (GPS, GLONASS, GALILEO)
- ADVANCED RUGGED SYSTEM DESIGN
- BLUETOOTH WIRELESS TECHNOLOGY
- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION

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## It's time.

Topcon is proud to be the world leader in advanced satellite positioning technology. From our leadership in dual constellation, GNSS receivers, springs the next generation of satellite positioning technology - G3. G3 is the first technology to combine all three satellite positioning systems - GPS, GLONASS, and the European Galileo system. In addition to adding the Galileo system to Topcon's industry leading GPS+GLONASS technology, the new G3 chip technology incorporates all the planned signal modernization of the GPS and GLONASS satellite systems, representing a system that is designed to track all available positioning satellite signals, available now or planned for the future!

The new G3 technology from Topcon ensures our users that a system they invest in today will still be fully operational far into the foreseeable future, eliminating the need to buy a new receiver as the new signals come on line. Only Topcon offers the Universal Tracking technology found in the new G3 receiver system, demonstrating clear technology leadership.

Just imagine combining all the power of the new G3 tracking technology in a small, rugged field receiver. The new Topcon GR-3 receiver represents the next generation of advanced system design and tracking technology from Topcon, and truly sets new standards of performance, accuracy, and innovative receiver design. Offering advanced design features not found in other receivers, the GR-3's modern design provides the flexibility and ease-of-use you demand. Bluetooth technology provides G3 users with the advantages of a completely cable-free system setup, with any Windows CE field controller, and the ultra-rugged construction of the GR-3 is designed to take the punishment of any jobsite.

Topcon's GR-3 with its Universal Signal Tracking and a wide array of advanced design features is truly a revolutionary receiver, far ahead of any other receiver technology available!

Welcome to the next generation of satellite positioning technology!



GR-3  
G3 Enabled GNSS Receiver



## The new Topcon GR-3 represents the next generation in GPS+ receiver technology.

### G3 Tracking Technology

- 72 "Universal" channels support all current and pending satellite positioning signals
- All GPS Signals
- All Glonass Signals
- All Galileo Signals

### Advanced System Design

- Hot-Swappable Batteries
- Li-ION Rechargeable or Alkaline
- Completely Cable-Free Design
- Convenient Quick Snap pole mounting system

### Memory & Communication

- Easy Access SD & SIM Cards
- 915 MHz Spread Spectrum Radio
- Optional Internal GSM/GPRS
- Bluetooth Wireless Technology

### Ultra Rugged Construction

- Durable magnesium housing
- I-Beam construction for added strength
- Weatherproof design
- Withstands 2(m) pole drop onto concrete
- Environmentally sealed external ports

### Combine the GR-3 with a Topcon Controller!

- Topcon's FC Series Field Controllers
- Full color touch screen
- Graphical Windows interface
- Operates the full suite of Topcon field controller software packages
- Wireless operation via Bluetooth connection



## The GR-3 is the next generation RTK GPS system from Topcon. This exciting new system incorporates G3 tracking technology to track all three satellite positioning systems as well as new design features not found in any other system.



### Cable-Free Base & Rover Operation

- No cables from broken cables
- Quick, easy setup & teardown
- Simple to learn & use
- All fits in one small hand sized case



### Dual Receiver Package Includes:

- Two GR-3 Receivers
- Charging Cables
- PC Data Cables
- Hard Carry Case
- Radio Antennas
- Manuals & Utility software
- Field Height Tripod



## Accessories

**GMS-2 Dual-use Controller**  
Combine surveying and GIS location tasks with the optional GMS-2 controller. Navigate using the integrated GPS, then operate as an RTK controller connected to the GR-3.

**Optional Smart Charger**  
(shaded in box or blue/white package)

- Charge Batteries
- External Power Supply
- Integrated Tripod Hook

**Topcon Tools Office Software Suite**  
Post processing raw GPS data, verification of RTK measurements or combining satellite data with terrestrial measurements, Topcon's Topcon Tool Software Suite provides unorganized power and flexibility.

**Field Controller Software**

**TopSURV**  
Topcon's professional survey Field Control Software.

**Pocket 3-D**  
Topcon's Field Software designed specifically for the contractor.

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And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an indicate-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or ag/land leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

### The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

### Offices Worldwide

**TOPCON CORPORATION**  
7-1-1 Hiranuma-cho, Maibashi-ku, Tokyo 114-8502, Japan  
Phone: 3-3338-2320 • Fax: 3-3363-4214 • [www.topcon.jp](http://www.topcon.jp)

**Topcon Europe Positioning B.V.**  
Eisbaan 11, 2008 LJ Capelle a/d IJssel • THE NETHERLANDS  
Phone: 0148-620771 • Fax: 0148-620782 • [www.topconpositioning.com](http://www.topconpositioning.com)

**Topcon Corporation Beijing Office**  
Block A No. 5 Kangyue Street, Beijing Economic  
Technological Development Area, Beijing 10015 • CHINA  
Tel: +86-10-63027292 • Fax: +86-10-63027293



**Topcon Positioning Systems, Inc.**  
7900 National Drive  
Livermore, CA 94550  
[www.topconpositioning.com](http://www.topconpositioning.com)

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### Basic Specifications

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signals Tracked:	GPS
	L1 L2, & L5 carrier, CA, L1 P, L2 P, L2C
	GLONASS
	L1 L2, & L5 carrier, L1 CA, L2 CA, L1 P, L2 P
	GALILEO
	E2 L1 E5 E5c
WAAS/EGNOS	Yes
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real time RTK accuracy	H: 10mm+1ppm V: 15mm+1ppm
Post processed Static DGPS	H: ±3.0mm+0.5ppm V: ±5.0mm+0.5ppm
<b>COMMUNICATIONS</b>	
Optimal Radio Type	Integrated Tri/Bi 915MHz Spread Spectrum
Base Radio Output	0.250 - 1.0 Watts, selectable
Cellular Communications	Integrated via SIM Card, GSM/GPRS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update/Output Rate	1 - 20Hz, Selectable
Real Time Data Output	TPS, RTCM SC100, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External, Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium I-Beam Housing
Operating Temperature	-20 to +50C with batteries
Environmental Specification	IP66 waterproof/dustproof
Shock Rating	2 meter pole drop

### The Leader in Positioning Technology...

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From open field construction projects to isolated surveying sites and from rolling farmland to inner city utility projects, Topcon Positioning Systems provides innovative technology that provides a decidedly competitive edge to end-users.

The recognized innovative trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands facing construction, surveying, agriculture, utilities and law enforcement industries worldwide.

Your local Authorized Topcon dealer is:

### GR-3



### G3 ENABLED GNSS RECEIVER



#### Advanced GPS+ Technology

- G3 SATELLITE TRACKING (GPS, GLONASS, GALILEO)
- ADVANCED RUGGED SYSTEM DESIGN
- BLUETOOTH WIRELESS TECHNOLOGY
- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION



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### Specifications

	AT-G1	AT-G2/2A	AT-G3	AT-G4	AT-G6
<b>TELESCOPE</b>					
Length (in./mm)	9/229	9/229	9/230	7.7/192	7.7/193
Image	erect	erect	erect	erect	erect
Magnification	32x	32x	30x	26x	24x
Objective lens (in./mm)	1.6/45	1.6/45	1.6/40	1.2/30	1.2/30
Relative brightness	1.98	1.98	1.78	1.33	1.56
Field of view	1°20'	1°20'	1°30'	1°30'	1°50'
Resolving power	2.5"	2.5"	3.0"	3.5"	4.0"
Minimum focus (ft./m)	3.2/1.0	3.2/1.0	1.6/0.5	1.6/0.5	1.6/0.5
Stadia constant (m)	0	0	0	0	0
Stadia ratio	100	100	100	100	100
<b>CIRCULAR LEVEL</b>					
Sensuality (2/mm)	8"	8"	8"	8"	8"
<b>AUTOMATIC LEVELING</b>					
Setting accuracy	±0.3"	±0.3"	±0.3"	±0.3"	±0.3"
Compensating range	±15'	±15'	±15'	±15'	±15'
<b>ACCURACY @ 100FT. (30M)</b>					
w/o optical micrometer (in./mm)	-	-	-	±0.08/±2.0	±0.08/±2.0
<b>ACCURACY WITH DOUBLE RING LEVEL</b>					
w/o optical micrometer (in./mm)	±0.03/±0.7	±0.03/±0.7	±0.06/±1.5	±0.08/±2.0	±0.08/±2.0
with optical micrometer	±0.02/±0.4	±0.02/±0.4	±0.04/±0.0	N/A	N/A
<b>HORIZONTAL CIRCLE</b>					
Diameter (in./mm)	3.5/90	4.7/117	4.7/117	4.7/117	4.7/117
Minimum division	10' (0.1g)	1" (1g)	1" (1g)	1" (1g)	1" (1g)
<b>WEIGHT</b>					
Instrument (lbs./kgs.)	4.6/2.1	4.1/1.8	4.1/1.8	3.5/1.6	3.5/1.6
Plastic carrying case (lbs./kgs.)	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3

### Offices Worldwide

**TOPCON CORPORATION**  
7-1-1 Hiranuma-cho, Maibashi-ku, Tokyo 114-8502, Japan  
Phone: 3-3338-2320 • Fax: 3-3363-4214 • [www.topcon.jp](http://www.topcon.jp)

**Topcon Europe Positioning B.V.**  
Eisbaan 11, 2008 LJ Capelle a/d IJssel • THE NETHERLANDS  
Phone: 0148-620771 • Fax: 0148-620782 • [www.topconpositioning.com](http://www.topconpositioning.com)

**Topcon Corporation Beijing Office**  
Block A No. 5 Kangyue Street, Beijing Economic  
Technological Development Area, Beijing 10015 • CHINA  
Tel: +86-10-63027292 • Fax: +86-10-63027293



**Topcon Positioning Systems, Inc.**  
7900 National Drive  
Livermore, CA 94550  
[www.topconpositioning.com](http://www.topconpositioning.com)

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P/N: 7010-0705 Rev. A Printed in U.S.A. 5/07

### The Leader in Positioning Technology...

Your authorized Topcon dealer has the answer for all of your precise positioning needs. Whether you're looking for precision GPS+ control for surveying and engineering applications or layout and grade management on a construction job site, your local Topcon dealer offers the widest range of products to get the job done quickly and accurately.

And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an indicate-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or ag/land leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

### The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

Your local Authorized Topcon dealer is:

### AT-G SERIES



### AT-G SERIES AUTO LEVELS



#### High accuracy, High value Auto Levels

- 6 MODELS - 24X TO 32X MAGNIFICATION
- WATERPROOF, DUSTPROOF CONSTRUCTION
- 2 SPEED FOCUS
- ANGULAR READING TO 10 MINUTES
- CLAMPLESS FINE HORIZONTAL ADJUSTMENTS
- VERY SHORT 0.5 METER FOCUSING
- AT-A-GLANCE LEVEL VIAL
- FAST, ACCURATE, AND STABLE LEVELING SYSTEM



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## It's time.

From Engineering to Construction, Topcon offers the industries most complete line of Auto Levels... Topcon, the World leader in precision survey optics, offers a complete line of high accuracy, highly durable auto levels that withstand the harsh environments of today's active job sites. All of Topcon's AT-G Series levels feature revolutionary magnetically dampened compensators that level faster with less sensitivity to vibration, a huge benefit when working near heavy equipment or active haul roads. And every AT-G model features Topcon's mylar suspension system, a World's First, that resists temperature induced errors associated with wire hung systems. All AT-G's are also waterproof, dustproof and dry-nitrogen charged eliminating lens clouding and condensation during temperature fluctuations throughout the day, or when inclement weather moves in.

At Topcon we're keenly aware of the value of your time, and the trust you put in your equipment to increase productivity and profitability while maintaining accuracy and reliability, and Topcon's AT-G Series delivers. Set-up and leveling is fast and accurate using the level vial mirror. Simply flip the protective cap up and use the integrated tribrach to level while glancing at the mirror. You won't even need to move your eye from the instrument eyepiece. Then get on target quickly using the coarse and fine focusing knobs located conveniently on either side of the telescope. For precise angle measurement, 1° rotation marks are provided on the base with numeric indication every 10°, up to a full 360°. The AT-G Series offers magnification powers from 24x to 32x for clear, precise shots over distance. The AT-G3, 4, and 6 even provide a super-short .5 meter focus for smaller sites.

**Green Label: high quality, high value from Topcon**  
Topcon is pleased to introduce Green Label. Green Label represents Topcon's commitment to supplying the Survey and Construction industries with the World's most cost effective, high quality positioning products. It's through Topcon's continued investment in state-of-the-art global engineering and manufacturing that Green Label is made possible. Green Label, the start of the next Topcon revolution. Topcon. It's time.

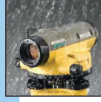


AT-G SERIES  
Auto Levels



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### Seven models to choose from, limitless applications, one thing in common: Topcon precision



**Waterproof/Dustproof construction**  
Completely waterproof and dustproof, the AT-G Series is ready to go to work whether it's dry and dusty, or cold and rainy. Even in damp confines such as tunneling, they're up to the task.

Each AT-G telescope is rigorously tested, then charged using dry nitrogen ensuring lens clouding and condensation won't be a problem with these levels.



**Angles made easy**  
**AT-G Only:** Topcon's AT-G1 incorporates a 2x microscope and transparent horizontal circle containing numbered degree indicators 360°. Get super accurate angle information to 10 arc minutes, with a slight turn of the head.

**AT-G2/3/4/6:** The AT-G Series base circle provides graduated angle indication clockwise from 1° to 360° (0° to 400°) making angle measurements a snap. Values are indicated at 10° increments for a given reference.



**Very short 1.65' (0.5m) focus**  
**(AT-G1/AT-G4/AT-G6 only)**  
Big jobs or small, close-in or across the site, Topcon's AT-G Series feature a very short focus distance so you can set it up where it's the most useful, and out of the way.



**Easy-to-see level vial**  
Level up without moving from the eyepiece. Using the integrated level mirror, simply tilt the mirror so the circular level vial is viewable at eye height of the operator. Now just use the tribrach base to center the circular level vial and level the AT-G with a slight tilt of the eye. When not in use, keep the cap closed to protect the vial and mirror from dirt and damage.

### New Ergonomic design

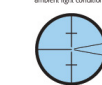
Redesigned for smoother, easier operation, Topcon's G Series levels feature large, ergonomically placed knobs, laser accurate adjustments and lightweight materials for less weight when you're on the move.



### Topcon's automatic levels are compact, lightweight, and completely waterproof. From Engineering to construction, open it up to tunneling, there's an AT-G made to fit you and your jobs.



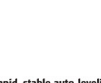
**AT-G2A**  
32x magnification, 2-speed focus, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.



**AT-G1**  
32x magnification, 2x microscope for angle readings to 10 arc minutes, 2-speed focus, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.



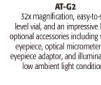
**AT-G3**  
30x magnification, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, and illuminator for low ambient light conditions.



**AT-G4 Green Label**  
26x magnification, easy-to-see level vial, and short-range 0.5 meter focus.



**AT-G2**  
32x magnification, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.



**AT-G2**  
32x magnification, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.

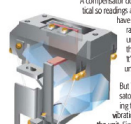


**AT-G6 Green Label**  
24x magnification, easy-to-see level vial, and short-range 0.5 meter focus.



**AT-G6 Green Label**  
26x magnification, easy-to-see level vial, and short-range 0.5 meter focus.

### Rapid, stable auto-leveling



A compensator does just that, it compensated for slight errors in vertical so readings are consistent. Traditional wire hung compensators have been proven to expand and contract at varying rates, fluctuating greatly throughout the day as the unit warms or cools. That's why Topcon introduced the World's First mylar suspended compensator. It's resistant to expansion and contraction providing unmatched accuracy throughout the day.

But Topcon didn't stop there. All AT-G Series compensators also feature magnetic dampening, greatly speeding the "settling" of the unit after set up, and limiting adjustments due to heavy machine operation or traffic near the unit. Simply put, these are the most advanced, accurate and long-lasting levels available, and they're only from Topcon!

### AT-G Series package

- Auto level
- Hard shell carry case
- Plumb bob
- Lens cleaning cloth
- Weather protective bag
- Allen wrench
- Operator's manual



### Accessories

Make your AT-G Series even more productive by adding these optional accessories. Contact your local Topcon Dealer for availability and pricing.



**Vertical Eyepiece**, Part # 55302  
Take readings with a simple tilt of your head. The vertical eye-piece eliminates the bending and stooping that causes fatigue and discomfort after a long day on the job. (AT-G1/AT-G2/AT-G3/AT-G4 only)



**Optical Micrometer**, Part # 56305 (0), 56352 (0), 56305 (M)  
Add Topcon's optical micrometer to your AT-G Series and improve accuracy to ±.001" (0.025mm) over ±.0001" (0.0025mm) (1mm) of double star reading. It easily attaches to front, over the lens, with a counter weight attached to the eyepiece. (AT-G1/AT-G2/AT-G3/AT-G4/AT-G5 only)



**Illuminator**, Part # 56308  
Topcon's Illuminator adds just enough light to the telescope to see targeting and angular reference marks in dim light applications such as tunneling, or at night. (AT-G1/AT-G2/AT-G3/AT-G4/AT-G5 only)



**40X Eyepiece**, Part # 56306  
Boost the magnification of your AT-G Series quickly and easily by adding Topcon's 40x magnifier in place of the existing eyepiece. (AT-G1/AT-G2/AT-G3/AT-G4 only)

### Specifications

	AT-G1	AT-G2/2A	AT-G3	AT-G4	AT-G6
<b>TELESCOPE</b>					
Length (in./mm)	9/229	9/229	9/230	7.7/192	7.7/193
Image	erect	erect	erect	erect	erect
Magnification	32x	32x	30x	26x	24x
Objective lens (in./mm)	1.6/45	1.6/45	1.6/40	1.2/30	1.2/30
Relative brightness	1.98	1.98	1.78	1.33	1.56
Field of view	1°20'	1°20'	1°30'	1°30'	1°50'
Resolving power	2.5"	2.5"	3.0"	3.5"	4.0"
Minimum focus (ft./m)	3.2/1.0	3.2/1.0	1.6/0.5	1.6/0.5	1.6/0.5
Stadia constant (m)	0	0	0	0	0
Stadia ratio	100	100	100	100	100
<b>CIRCULAR LEVEL</b>					
Sensuality (2mm)	8"	8"	8"	8"	8"
<b>AUTOMATIC LEVELING</b>					
Setting accuracy	±0.3"	±0.3"	±0.3"	±0.3"	±0.3"
Compensating range	±15'	±15'	±15'	±15'	±15'
<b>ACCURACY @ 100FT. (30M)</b>					
w/o optical micrometer (in./mm)	±0.005/±0.7	±0.005/±0.7	±0.006/±1.5	±0.008/±2.0	±0.008/±2.0
<b>ACCURACY WITH DOUBLE STAR LEVEL</b>					
w/o optical micrometer (in./mm)	±0.003/±0.4	±0.003/±0.4	±0.004/±0.0	N/A	N/A
<b>HORIZONTAL CIRCLE</b>					
Diameter (in./mm)	3.5/90	4.7/117	4.7/117	4.7/117	4.7/117
Minimum division	10' (0.1g)	1" (1g)	1" (1g)	1" (1g)	1" (1g)
<b>WEIGHT</b>					
Instrument (lbs./kgs.)	4.6/2.1	4.1/1.8	4.1/1.8	3.5/1.6	3.5/1.6
Plastic carrying case (lbs./kgs.)	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3

### Offices Worldwide

**TOPCON CORPORATION**  
7-11 Higashi-1-chome, Minami 5-chome, Itami-shi, Osaka  
Phone: +81-6-6708-2200 • Fax: +81-6-6708-0144 • www.topcon.jp

**Topcon Europe Positioning B.V.**  
Eindhaven 11, 2068 LC Capelle op den Duin • THE NETHERLANDS  
Phone: +31-184-630077 • Fax: +31-184-630045 • www.topcon.com

**Topcon Corporation (China) Office**  
Room 101, Kangfeng Building, Economic  
Technology Development Area, Beijing 100175 • CHINA  
Tel: +86-10-6306-2760 • Fax: +86-10-6306-2759



**Topcon Positioning Systems, Inc.**  
11400 National Drive  
Livermore, CA 94550  
www.topconpositioning.com

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### AT-G SERIES



### AT-G SERIES AUTO LEVELS



High accuracy, High value Auto Levels

- 6 MODELS - 24X TO 32X MAGNIFICATION
- WATERPROOF, DUSTPROOF CONSTRUCTION
- 2 SPEED FOCUS
- ANGULAR READING TO 10 MINUTES
- CLAMPLESS FINE HORIZONTAL ADJUSTMENTS
- VERY SHORT 0.5 METER FOCUSING
- AT-A-GLANCE LEVEL VIAL
- FAST, ACCURATE, AND STABLE LEVELING SYSTEM



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### III.

## NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.89.1

1 National Geodetic Survey, Retrieval Date = JULY 18, 2012

AA4460

\*\*\*\*\*

AA4460 DESIGNATION - OFU C

AA4460 PID - AA4460

AA4460 STATE/COUNTY- AS/MANAU A (DISTRICT)

AA4460 COUNTRY - US

AA4460 USGS QUAD - MANUA ISLANDS (1963)

AA4460

AA4460 \*CURRENT SURVEY CONTROL

AA4460

---

AA4460\* NAD 83(PA11) POSITION- 14 11 02.08718(S) 169 40 22.13391(W) ADJUSTED

AA4460\* NAD 83(PA11) ELLIP HT- 34.805 (meters) (06/27/12) ADJUSTED

AA4460\* NAD 83(PA11) EPOCH - 2010.00

AA4460\* [LMSL](#) ORTHO HEIGHT - 3.3 (meters) 11. (feet) GPS OBS

AA4460

---

AA4460 LMSL orthometric height was determined with geoid model OSU 91A

AA4460 GEOID HEIGHT - 29.07 (meters) OSU 91A

AA4460 GEOID HEIGHT - 31.11 (meters) GEOID12

AA4460 NAD 83(PA11) X - -6,084,775.209 (meters) COMP

AA4460 NAD 83(PA11) Y - -1,108,773.704 (meters) COMP

AA4460 NAD 83(PA11) Z - -1,552,726.166 (meters) COMP

AA4460 LAPLACE CORR - -0.38 (seconds) DEFLEC09

AA4460

AA4460 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

AA4460 Type Horiz Ellip Dist(km)

AA4460

AA4460 NETWORK 3.50 10.90

AA4460

AA4460 MEDIAN LOCAL ACCURACY AND DIST (001 points) 1.00 10.90 0.62

AA4460

AA4460 NOTE: Click [here](#) for information on individual local accuracy

AA4460 values and other accuracy information.

AA4460

AA4460

AA4460.The horizontal coordinates were established by GPS observations

AA4460.and adjusted by the National Geodetic Survey in June 2012.

AA4460

AA4460.NAD 83(PA11) refers to NAD 83 coordinates where the reference

AA4460.frame has been affixed to the stable Pacific tectonic plate.

AA4460

AA4460.The horizontal coordinates are valid at the epoch date displayed above

AA4460.which is a decimal equivalence of Year/Month/Day.

AA4460

AA4460.The orthometric height was determined by GPS observations and a

AA4460.high-resolution geoid model.

AA4460

AA4460.The X, Y, and Z were computed from the position and the ellipsoidal

ht.

AA4460

AA4460.The Laplace correction was computed from DEFLEC09 derived deflections.



AA4460  
AA4460.The ellipsoidal height was determined by GPS observations  
AA4460.and is referenced to NAD 83.  
AA4460  
AA4460. The following values were computed from the NAD 83(PA11) position.  
AA4460  
AA4460; North East Units Scale Factor Converg.  
AA4460;UTM 02 - 8,431,527.155 643,220.375 MT 0.99985372 +0 19 30.9  
AA4460  
AA4460! - Elev Factor x Scale Factor = Combined Factor  
AA4460!UTM 02 - 0.99999453 x 0.99985372 = 0.99984825  
AA4460  
AA4460 SUPERSEDED SURVEY CONTROL  
AA4460  
AA4460 NAD 83(2002)- 14 11 02.08647(S) 169 40 22.13441(W) AD(2002.00) 1  
AA4460 ELLIP H (04/01/03) 34.845 (m) GP(2002.00) 4 1  
AA4460 NAD 83(1993)- 14 11 02.07749(S) 169 40 22.13260(W) AD(1993.62) 1  
AA4460 ELLIP H (11/30/94) 35.291 (m) GP(1993.62) 5 1  
AA4460  
AA4460.Superseded values are not recommended for survey control.  
AA4460  
AA4460.NGS no longer adjusts projects to the AS datum.  
AA4460.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA4460  
AA4460\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK4322031527(NAD 83)  
AA4460  
AA4460\_MARKER: DD = SURVEY DISK  
AA4460\_SETTING: 0 = UNSPECIFIED SETTING  
AA4460\_SP\_SET: RUNWAY PAVEMENT  
AA4460\_STAMPING: OFU C 1993  
AA4460\_MARK LOGO: NGS  
AA4460\_MAGNETIC: 0 = OTHER; SEE DESCRIPTION  
AA4460\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY  
AA4460\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA4460+SATELLITE: SATELLITE OBSERVATIONS - 1993  
AA4460  
AA4460 HISTORY - Date Condition Report By  
AA4460 HISTORY - 1993 MONUMENTED NOS  
AA4460 HISTORY - 19950502 GOOD NGS  
AA4460  
AA4460 STATION DESCRIPTION  
AA4460  
AA4460'DESCRIBED BY NATIONAL OCEAN SERVICE 1993 (JGF)  
AA4460'THE STATION IS LOCATED ON THE ISLAND OF OFU, MANUA ISLANDS, AMERICAN  
AA4460'SAMOA, AT THE OFU AIRPORT. THE STATION IS 164 FT (50.0 M) NNW OF THE  
AA4460'RUNWAY 8 WINDSOCK, 29 FT (8.8 M) E OF THE W EDGE OF THE PAVEMENT, AND  
AA4460'29 FT (8.8 M) N OF THE CENTERLINE OF THE RUNWAY. THE STATION IS A  
AA4460'STANDARD NOS SURVEY DISK STAMPED -OFU C 1993- SET IN THE N SIDE OF THE  
AA4460'RUNWAY PAVEMENT AT RUNWAY 8 BEYOND THE THRESHOLD LIGHTS.  
AA4460  
AA4460 STATION RECOVERY (1995)  
AA4460  
AA4460'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995  
AA4460'THE STATION IS LOCATED IN THE WEST PART OF THE AIRPORT NEAR RWY END 8.  
AA4460'IT IS 29.2 FT (8.9 M) NORTH OF CL END RWY 8 (INTERSECTION OF EXPANSION  
AA4460'JOINTS AT CHISELED SQUARE), 0.9 FT (27.4 CM) WEST OF THE EXPANSION  
AA4460'JOINT LEADING NORTH FROM THE CL END AND 0.8 FT (24.4 CM) SOUTH OF THE  
AA4460'NORTH EDGE OF PAVEMENT. IT IS AN NOS DISK STAMPED OFU C 1993 SET IN A

AA4460'DRILLHOLE FUSH WITH THE CONCRETE PAVEMENT.  
1 National Geodetic Survey, Retrieval Date = JULY 18, 2012  
AA3713

\*\*\*\*\*

## DATASHEETS

AA3713 DESIGNATION - OLOSEGA ET  
AA3713 PID - AA3713  
AA3713 STATE/COUNTY- AS/MANAU A (DISTRICT)  
AA3713 COUNTRY - US  
AA3713 USGS QUAD - MANUA ISLANDS (1963)  
AA3713  
AA3713 \*CURRENT SURVEY CONTROL  
AA3713

---

AA3713\* NAD 83(PA11) POSITION- 14 10 55.26933(S) 169 37 17.35988(W) NO CHECK  
AA3713\* NAD 83(PA11) ELLIP HT- 33.257 (meters) (06/27/12) NO CHECK  
AA3713\* NAD 83(PA11) EPOCH - 2010.00  
AA3713\* [LMSL](#) ORTHO HEIGHT - 2.0 (meters) 7. (feet) GPS OBS  
AA3713

---

AA3713 LMSL orthometric height was determined with geoid model EGM96  
AA3713 GEOID HEIGHT - 29.01 (meters) EGM96  
AA3713 GEOID HEIGHT - 31.03 (meters) GEOID12  
AA3713 NAD 83(PA11) X - -6,083,828.542 (meters) COMP  
AA3713 NAD 83(PA11) Y - -1,114,233.038 (meters) COMP  
AA3713 NAD 83(PA11) Z - -1,552,522.636 (meters) COMP  
AA3713 LAPLACE CORR - 1.94 (seconds) DEFLEC09  
AA3713  
AA3713 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)  
AA3713 Type Horiz Ellip Dist(km)  
AA3713 -----  
AA3713 NETWORK 5.05 20.76  
AA3713 -----  
AA3713 MEDIAN LOCAL ACCURACY AND DIST (001 points) 3.76 20.76 4.93  
AA3713 -----  
AA3713 NOTE: Click [here](#) for information on individual local accuracy  
AA3713 values and other accuracy information.  
AA3713  
AA3713  
AA3713.The horizontal coordinates were established by GPS observations  
AA3713.and adjusted by the National Geodetic Survey in June 2012.  
AA3713  
AA3713.NAD 83(PA11) refers to NAD 83 coordinates where the reference  
AA3713.frame has been affixed to the stable Pacific tectonic plate.  
AA3713  
AA3713.The horizontal coordinates are valid at the epoch date displayed above  
AA3713.which is a decimal equivalence of Year/Month/Day.  
AA3713  
AA3713.No horizontal observational check was made to the station.  
AA3713.  
AA3713.The orthometric height was determined by GPS observations and a  
AA3713.high-resolution geoid model.  
AA3713  
AA3713.The X, Y, and Z were computed from the position and the ellipsoidal  
ht.  
AA3713  
AA3713.The Laplace correction was computed from DEFLEC09 derived deflections.  
AA3713  
AA3713.The ellipsoidal height was determined by GPS observations

AA3713.and is referenced to NAD 83.  
AA3713  
AA3713. The following values were computed from the NAD 83(PA11) position.  
AA3713  
AA3713; North East Units Scale Factor Converg.  
AA3713;UTM 02 - 8,431,704.605 648,761.289 MT 0.99987373 +0 20 16.1  
AA3713  
AA3713! - Elev Factor x Scale Factor = Combined Factor  
AA3713!UTM 02 - 0.99999477 x 0.99987373 = 0.99986850  
AA3713  
AA3713 SUPERSEDED SURVEY CONTROL  
AA3713  
AA3713 NAD 83(2002)- 14 10 55.26861(S) 169 37 17.36038(W) AD(2002.00) 1  
AA3713 ELLIP H (04/01/03) 33.298 (m) GP(2002.00) 4 1  
AA3713 NAD 83(1993)- 14 10 55.25963(S) 169 37 17.35858(W) AD(1993.62) 1  
AA3713 ELLIP H (11/30/94) 33.744 (m) GP(1993.62) 5 1  
AA3713 ASD 62 - 14 11 13.55796(S) 169 37 12.93814(W) AD( ) 3  
AA3713  
AA3713.Superseded values are not recommended for survey control.  
AA3713  
AA3713.NGS no longer adjusts projects to the AS datum.  
AA3713.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA3713  
AA3713\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK4876131704(NAD 83)  
AA3713  
AA3713\_MARKER: DD = SURVEY DISK  
AA3713\_SETTING: 65 = SET IN UNSPECIFIED ROCK OR BOULDER  
AA3713\_SP\_SET: IN DRILL HOLE IN ROCK OUTCROP  
AA3713\_STAMPING: OLOSEGA ET 1962 RN GARDNER  
AA3713\_MARK LOGO: USGS  
AA3713\_MAGNETIC: O = OTHER; SEE DESCRIPTION  
AA3713\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL  
AA3713\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA3713+SATELLITE: SATELLITE OBSERVATIONS - July 14, 1993  
AA3713  
AA3713 HISTORY - Date Condition Report By  
AA3713 HISTORY - 1962 MONUMENTED USGS  
AA3713 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3713 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3713 HISTORY - 19930714 GOOD NOS  
AA3713  
AA3713 STATION DESCRIPTION  
AA3713  
AA3713'DESCRIBED BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3713'LOCATED AT THE SOUTHERN END OF OLOSEGA VILLAGE ABOUT 1800 FT SE OF  
AA3713'CHURCH ON POUONO POINT AT THE VERY EDGE OF THE COCOUT-BUSH LINE AND  
AA3713'THE CORAL BEACH.  
AA3713'  
AA3713'THE STATION MARK IS A STANDARD TABLET STAMPED OLOSEGA ET 1962 RN  
AA3713'GARDNER SET IN ROCK OUTCROP.  
AA3713'  
AA3713'  
AA3713  
AA3713 STATION RECOVERY (1962)  
AA3713  
AA3713'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3713'LOCATED AT THE SOUTHERN END OF OLOSEGA VILLAGE ABOUT 1800 FT SE OF  
AA3713'CHURCH ON POUONO POINT AT THE VERY EDGE OF THE COCOUT-BUSH LINE AND





AA4465  
AA4465.The X, Y, and Z were computed from the position and the ellipsoidal  
ht.  
AA4465  
AA4465.The Laplace correction was computed from DEFLEC09 derived deflections.  
AA4465  
AA4465.The ellipsoidal height was determined by GPS observations  
AA4465.and is referenced to NAD 83.  
AA4465  
AA4465. The following values were computed from the NAD 83(PA11) position.  
AA4465  
AA4465; North East Units Scale Factor Converg.  
AA4465;UTM 02 - 8,427,769.493 670,202.230 MT 0.99995833 +0 23 14.9  
AA4465  
AA4465! - Elev Factor x Scale Factor = Combined Factor  
AA4465!UTM 02 - 0.99999018 x 0.99995833 = 0.99994851  
AA4465  
AA4465: Primary Azimuth Mark Grid Az  
AA4465:UTM 02 - TAU A 305 11 43.7  
AA4465  
AA4465|-----|  
AA4465| PID Reference Object Distance Geod. Az |  
AA4465| dddmss.s |  
AA4465| AA4464 TAU B 224.518 METERS 15251 |  
AA4465| AA4463 TAU A APPROX. 0.5 KM 3053458.6 |  
AA4465|-----|  
AA4465  
AA4465 SUPERSEDED SURVEY CONTROL  
AA4465  
AA4465 NAD 83(2002)- 14 12 58.90060(S) 169 25 21.38977(W) AD(2002.00) 1  
AA4465 ELLIP H (04/01/03) 62.510 (m) GP(2002.00) 4 1  
AA4465 NAD 83(1993)- 14 12 58.89155(S) 169 25 21.38801(W) AD(1993.62) 1  
AA4465 ELLIP H (11/30/94) 62.948 (m) GP(1993.62) 5 1  
AA4465  
AA4465.Superseded values are not recommended for survey control.  
AA4465  
AA4465.NGS no longer adjusts projects to the AS datum.  
AA4465.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA4465  
AA4465\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK7020227769(NAD 83)  
AA4465  
AA4465\_MARKER: DD = SURVEY DISK  
AA4465\_SETTING: 0 = UNSPECIFIED SETTING  
AA4465\_SP\_SET: SURROUNDED BY MASS OF CONCRETE  
AA4465\_STAMPING: TAU C 1993  
AA4465\_MARK LOGO: NGS  
AA4465\_MAGNETIC: 0 = OTHER; SEE DESCRIPTION  
AA4465\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY  
AA4465\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA4465+SATELLITE: SATELLITE OBSERVATIONS - 1993  
AA4465  
AA4465 HISTORY - Date Condition Report By  
AA4465 HISTORY - 1993 MONUMENTED NOS  
AA4465 HISTORY - 19950502 GOOD NGS  
AA4465  
AA4465 STATION DESCRIPTION  
AA4465  
AA4465'DESCRIBED BY NATIONAL OCEAN SERVICE 1993 (JGF)

AA4465'THE STATION IS LOCATED NEAR MIDFIELD AT FITIUTA AIRPORT ON THE ISLAND  
AA4465'OF TAU, MANUA ISLANDS, AMERICAN SAMOA, IN THE VILLAGE OF FITIUTA. THE  
AA4465'STAITON IS LOCATED ON THE NE SIDE OF RUNWAY 12/30, IN THE NW SECTION  
AA4465'OF A SEGMENTED WIND CIRCLE IN A CONCRETE BLOCK. THE STATION IS 129.0  
AA4465'FT (39.3 M) NE OF THE NE EDGE OF THE RUNWAY, 69.6 FT (21.2 M) SW OF A  
AA4465'CLUMP OF FUTU TREES ON THE CLIFF NE OF THE RUNWAY, AND 51.4 FT (15.7  
AA4465'M) NW OF THE WINDSOCK. TO OBTAIN ACCESS TO THE STATION AND THE AIRPORT  
AA4465'CONTACT THE FAA REPRESENTATIVE MR. TAUFA ESE E TE I, FITIUTA POST  
AA4465'OFFICE, PAGO PAGO, AMERICAN SAMOA 96779. PHONE 684-677-3499/3418.  
AA4465

AA4465 STATION RECOVERY (1995)

AA4465

AA4465'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995

AA4465'THE STATION IS LOCATED IN THE CENTRAL PART OF THE AIRPORT NORTHEAST OF  
AA4465'RWY 12-30 AND AT A WINDSOCK SITE. IT IS 165.8 FT (50.5 M) NORTHEAST  
AA4465'OF THE RUNWAY CENTERLINE AND 51.7 FT (15.8 M) NNW OF THE WINDSOCK  
AA4465'POLE. IT IS SET IN ONE OF THE 3X8 FT CONCRETE PADS WHICH FORM THE  
AA4465'SEGMENTED CIRCLE. THE STATION IS AN NOS DISK STAMPED TAU C 1993 SET  
AA4465'IN A DRILLHOLE FLUSH WITH THE CONCRETE SURFACE 2 FT (0.6 M) WEST OF  
AA4465'THE EAST END AND 1.5 FT (0.5 M) NORTH OF THE SOUTH EDGE.

1 National Geodetic Survey, Retrieval Date = JULY 18, 2012

AA3715

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## DATASHEETS

AA3715 DESIGNATION - TAU ET

AA3715 PID - AA3715

AA3715 STATE/COUNTY- AS/MANAU A (DISTRICT)

AA3715 COUNTRY - US

AA3715 USGS QUAD - MANUA ISLANDS (1963)

AA3715

AA3715 \*CURRENT SURVEY CONTROL

AA3715

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AA3715\* NAD 83(PA11) POSITION- 14 14 15.35437(S) 169 30 47.51347(W) NO CHECK

AA3715\* NAD 83(PA11) ELLIP HT- 31.412 (meters) (06/27/12) NO CHECK

AA3715\* NAD 83(PA11) EPOCH - 2010.00

AA3715\* [LMSL](#) ORTHO HEIGHT - 0.59 (meters) 1.9 (feet) LEVELING

AA3715

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AA3715 GEOID HEIGHT - 30.61 (meters) GEOID12

AA3715 NAD 83(PA11) X - -6,080,225.691 (meters) COMP

AA3715 NAD 83(PA11) Y - -1,125,454.582 (meters) COMP

AA3715 NAD 83(PA11) Z - -1,558,483.411 (meters) COMP

AA3715 LAPLACE CORR - 2.06 (seconds) DEFLEC09

AA3715 VERT ORDER - THIRD ?

AA3715

AA3715 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

AA3715 Type Horiz Ellip Dist(km)

AA3715 -----

AA3715 NETWORK 3.34 10.53

AA3715 -----

AA3715 MEDIAN LOCAL ACCURACY AND DIST (001 points) 0.85 10.53 0.55

AA3715 -----

AA3715 NOTE: Click [here](#) for information on individual local accuracy

AA3715 values and other accuracy information.

AA3715

AA3715

AA3715.The horizontal coordinates were established by GPS observations

AA3715.and adjusted by the National Geodetic Survey in June 2012.

AA3715  
AA3715.NAD 83(PA11) refers to NAD 83 coordinates where the reference  
AA3715.frame has been affixed to the stable Pacific tectonic plate.  
AA3715  
AA3715.The horizontal coordinates are valid at the epoch date displayed above  
AA3715.which is a decimal equivalence of Year/Month/Day.  
AA3715  
AA3715.No horizontal observational check was made to the station.  
AA3715.  
AA3715.The orthometric height was determined by differential leveling.  
AA3715.The vertical network tie was performed by a horz. field party for  
horz.  
AA3715.obs reductions. Reset procedures were used to establish the elevation.  
AA3715  
AA3715.The X, Y, and Z were computed from the position and the ellipsoidal  
ht.  
AA3715  
AA3715.The Laplace correction was computed from DEFLEC09 derived deflections.  
AA3715  
AA3715.The ellipsoidal height was determined by GPS observations  
AA3715.and is referenced to NAD 83.  
AA3715  
AA3715. The following values were computed from the NAD 83(PA11) position.  
AA3715  
AA3715; North East Units Scale Factor Converg.  
AA3715;UTM 02 - 8,425,484.263 660,410.482 MT 0.99991828 +0 21 56.7  
AA3715  
AA3715! - Elev Factor x Scale Factor = Combined Factor  
AA3715!UTM 02 - 0.99999506 x 0.99991828 = 0.99991334  
AA3715  
AA3715: Primary Azimuth Mark Grid Az  
AA3715:UTM 02 - TIDE GAGE ET 135 38 18.1  
AA3715  
AA3715|-----|  
AA3715| PID Reference Object Distance Geod. Az |  
AA3715| dddmmss.s |  
AA3715| AJ2300 TIDE GAGE ET RM 2 13151 |  
AA3715| AA3717 TIDE GAGE ET APPROX. 0.6 KM 1360014.8 |  
AA3715|-----|  
AA3715  
AA3715 SUPERSEDED SURVEY CONTROL  
AA3715  
AA3715 NAD 83(2002)- 14 14 15.35361(S) 169 30 47.51409(W) AD(2002.00) 1  
AA3715 ELLIP H (04/01/03) 31.456 (m) GP(2002.00) 4 1  
AA3715 NAD 83(1993)- 14 14 15.34481(S) 169 30 47.51223(W) AD(1993.62) 1  
AA3715 ELLIP H (11/30/94) 31.847 (m) GP(1993.62) 5 1  
AA3715 ASD 62 - 14 14 33.66300(S) 169 30 43.08500(W) AD( ) 2  
AA3715  
AA3715.Superseded values are not recommended for survey control.  
AA3715  
AA3715.NGS no longer adjusts projects to the AS datum.  
AA3715.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA3715  
AA3715\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK6041025484(NAD 83)  
AA3715  
AA3715\_MARKER: DD = SURVEY DISK  
AA3715\_SETTING: 65 = SET IN UNSPECIFIED ROCK OR BOULDER  
AA3715\_SP\_SET: SET IN CONCRETE IN ROCK

AA3715\_STAMPING: TAU ET 1962 RN GARDNER  
AA3715\_MARK LOGO: USGS  
AA3715\_MAGNETIC: N = NO MAGNETIC MATERIAL  
AA3715\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL  
AA3715\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA3715+SATELLITE: SATELLITE OBSERVATIONS - August 04, 1993  
AA3715  
AA3715 HISTORY - Date Condition Report By  
AA3715 HISTORY - 1962 MONUMENTED USGS  
AA3715 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3715 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3715 HISTORY - 19930804 GOOD NOS  
AA3715  
AA3715 STATION DESCRIPTION  
AA3715  
AA3715'DESCRIBED BY US GEOLOGICAL SURVEY 1962 (BES)  
AA3715'TAU CHURCH, 2000 FT S OF, ON FAASEUGA POINT, 50 FT FROM SHORE EDGE OF  
AA3715'POINT, IN ROCK, STANDARD TABLET STAMPED--TAU ET 1962 R N GARDNER--.  
AA3715  
AA3715 STATION RECOVERY (1962)  
AA3715  
AA3715'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3715'LOCATED ON FAASEUGA POINT, ABOUT 2000 FT S OF CHURCH IN TAU VILLAGE,  
AA3715'ABOUT 50 FT FROM SHORE EDGE OF POINT.  
AA3715'  
AA3715'STATION MARK IS A STANDARD TABLET STAMPED TAU ET 1962 RN GARDNER SET  
AA3715'IN CONCRETE IN DEPRESSION IN ROCK.  
AA3715  
AA3715 STATION RECOVERY (1962)  
AA3715  
AA3715'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3715'LOCATED ON FAASEUGA POINT, ABOUT 2000 FT S OF CHURCH IN TAU VILLAGE,  
AA3715'ABOUT 50 FT FROM SHORE EDGE OF POINT.  
AA3715'  
AA3715'STATION MARK IS A STANDARD TABLET STAMPED TAU ET 1962 RN GARDNER SET  
AA3715'IN CONCRETE IN DEPRESSION IN ROCK.  
AA3715  
AA3715 STATION RECOVERY (1993)  
AA3715  
AA3715'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (JGF)  
AA3715'RECOVERED AS DESCRIBED.  
1 National Geodetic Survey, Retrieval Date = JULY 18, 2012  
AA3717  
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## DATASHEETS

AA3717 DESIGNATION - TIDE GAGE ET  
AA3717 PID - AA3717  
AA3717 STATE/COUNTY- AS/MANAU A (DISTRICT)  
AA3717 COUNTRY - US  
AA3717 USGS QUAD - MANUA ISLANDS (1963)  
AA3717  
AA3717 \*CURRENT SURVEY CONTROL  
AA3717  
AA3717\* NAD 83(PA11) POSITION- 14 14 28.28498(S) 169 30 34.71342(W) ADJUSTED  
AA3717\* NAD 83(PA11) ELLIP HT- 33.485 (meters) (06/27/12) ADJUSTED  
AA3717\* NAD 83(PA11) EPOCH - 2010.00  
AA3717\* [ASVD02](#) ORTHO HEIGHT - 2.9 (meters) 10. (feet) GPS OBS



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AA3717
AA3717 NAD 83(PA11) X - -6,080,061.695 (meters) COMP
AA3717 NAD 83(PA11) Y - -1,125,814.465 (meters) COMP
AA3717 NAD 83(PA11) Z - -1,558,869.120 (meters) COMP
AA3717 LAPLACE CORR - 2.06 (seconds) DEFLEC09
AA3717 GEOID HEIGHT - 30.59 (meters) GEOID12
AA3717
AA3717 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AA3717 Type Horiz Ellip Dist(km)
AA3717 -----
AA3717 NETWORK 3.25 9.47
AA3717 -----
AA3717 MEDIAN LOCAL ACCURACY AND DIST (006 points) 0.78 9.47 9.78
AA3717 -----
AA3717 NOTE: Click here for information on individual local accuracy
AA3717 values and other accuracy information.
AA3717
AA3717
AA3717.The horizontal coordinates were established by GPS observations
AA3717.and adjusted by the National Geodetic Survey in June 2012.
AA3717
AA3717.NAD 83(PA11) refers to NAD 83 coordinates where the reference
AA3717.frame has been affixed to the stable Pacific tectonic plate.
AA3717
AA3717.The horizontal coordinates are valid at the epoch date displayed above
AA3717.which is a decimal equivalence of Year/Month/Day.
AA3717
AA3717.The orthometric height was determined by GPS observations and a
AA3717.high-resolution geoid model.
AA3717
AA3717.The X, Y, and Z were computed from the position and the ellipsoidal
AA3717.ht.
AA3717
AA3717.The Laplace correction was computed from DEFLEC09 derived deflections.
AA3717
AA3717.The ellipsoidal height was determined by GPS observations
AA3717.and is referenced to NAD 83.
AA3717
AA3717. The following values were computed from the NAD 83(PA11) position.
AA3717
AA3717; North East Units Scale Factor Converg.
AA3717;UTM 02 - 8,425,084.445 660,791.625 MT 0.99991979 +0 22 00.2
AA3717
AA3717! - Elev Factor x Scale Factor = Combined Factor
AA3717!UTM 02 - 0.99999473 x 0.99991979 = 0.99991452
AA3717
AA3717: Primary Azimuth Mark Grid Az
AA3717:UTM 02 - TAU ET 315 38 11.4
AA3717
AA3717|-----|
AA3717| PID Reference Object Distance Geod. Az |
AA3717| dddmss.s |
AA3717| AA3715 TAU ET APPROX. 0.6 KM 3160011.6 |
AA3717| AJ2301 TIDE GAGE ET RM 1 72.527 METERS 34349 |
AA3717| AJ2300 TIDE GAGE ET RM 2 64.907 METERS 34956 |
AA3717|-----|
AA3717
AA3717 SUPERSEDED SURVEY CONTROL

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AA3717  
AA3717 NAD 83(2002)- 14 14 28.28422(S) 169 30 34.71404(W) AD(2002.00) A  
AA3717 ELLIP H (02/05/03) 33.529 (m) GP(2002.00) 3 1  
AA3717 NAD 83(1993)- 14 14 28.27541(S) 169 30 34.71218(W) AD(1993.62) 1  
AA3717 ELLIP H (11/30/94) 33.920 (m) GP(1993.62) 5 1  
AA3717 ASD 62 - 14 14 46.59449(S) 169 30 30.28375(W) AD( ) 3  
AA3717  
AA3717.Superseded values are not recommended for survey control.  
AA3717  
AA3717.NGS no longer adjusts projects to the AS datum.  
AA3717.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA3717  
AA3717\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK6079125084(NAD 83)  
AA3717  
AA3717\_MARKER: DD = SURVEY DISK  
AA3717\_SETTING: 66 = SET IN ROCK OUTCROP  
AA3717\_SP\_SET: BEDROCK  
AA3717\_STAMPING: TIDE GAGE ET 1962 RN GARDNER  
AA3717\_MARK LOGO: USGS  
AA3717\_MAGNETIC: N = NO MAGNETIC MATERIAL  
AA3717\_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD  
AA3717+STABILITY: POSITION/ELEVATION WELL  
AA3717\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA3717+SATELLITE: SATELLITE OBSERVATIONS - July 16, 1993  
AA3717  
AA3717 HISTORY - Date Condition Report By  
AA3717 HISTORY - 1962 MONUMENTED USGS  
AA3717 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3717 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3717 HISTORY - 19930716 GOOD NOS  
AA3717  
AA3717 STATION DESCRIPTION  
AA3717  
AA3717'DESCRIBED BY US GEOLOGICAL SURVEY 1962 (BES)  
AA3717'TAU VILLAGE CHURCH, ABOUT 3600 FT AIRLINE, S OF, ON MATAVAI POINT, ON  
AA3717'THE FIRST POINT N OF THE SOUTHERNMOST PROJECTING BLACK ROCK, ABOUT 6  
AA3717'FT FROM THE OCEAN END OF POINT, IN ROCK, STANDARD TABLET STAMPED--TIDE  
AA3717'GAGE ET 1962 R N GARDNER--.  
AA3717  
AA3717 STATION RECOVERY (1962)  
AA3717  
AA3717'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3717'LOCATED 3600 FT S OF CHURCH IN TAU ON MATAVAI POINT.  
AA3717'  
AA3717'TO REACH TAKE TRAIL ALONG W COAST OF TAU TO THE FIRST POINT N OF  
AA3717'SOURTHERNMOST PROJECTING BLACK ROCK ABOUT 6 FT FROM OCEAN.  
AA3717'  
AA3717'STATION MARK IS A STANDARD TABLET STAMPED TIDE GAGE ET 1962 RN GARDNER  
AA3717'SET IN SOLID ROCK.  
AA3717'  
AA3717'REFERENCE MARK 1 IS A STANDARD TABLET STAMPED TIDE GAGE NO 1 1962 SET  
AA3717'ON ROCK POINT 237.95 FT FROM STATION MARK.  
AA3717'  
AA3717'REFERENCE MARK 2 IS A STANDARD REFERENCE MARK TABLET STAMPED TIDE GAGE  
AA3717'NO 2 1962 SET IN ROCK, 212.95 FT FROM STATION MARK.  
AA3717  
AA3717 STATION RECOVERY (1962)  
AA3717

AA3717'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3717'LOCATED 3600 FT S OF CHURCH IN TAU ON MATAVAI POINT.  
AA3717'  
AA3717'TO REACH TAKE TRAIL ALONG W COAST OF TAU TO THE FIRST POINT N OF  
AA3717'SOURTHERNMOST PROJECTING BLACK ROCK ABOUT 6 FT FROM OCEAN.  
AA3717'  
AA3717'STATION MARK IS A STANDARD TABLET STAMPED TIDE GAGE ET 1962 RN GARDNER  
AA3717'SET IN SOLID ROCK.  
AA3717'  
AA3717'REFERENCE MARK 1 IS A STANDARD TABLET STAMPED TIDE GAGE NO 1 1962 SET  
AA3717'ON ROCK POINT 237.95 FT FROM STATION MARK.  
AA3717'  
AA3717'REFERENCE MARK 2 IS A STANDARD REFERENCE MARK TABLET STAMPED TIDE GAGE  
AA3717'NO 2 1962 SET IN ROCK, 212.95 FT FROM STATION MARK.  
AA3717  
AA3717 STATION RECOVERY (1993)  
AA3717  
AA3717'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (JGF)  
AA3717'RECOVERED AS DESCRIBED WITH THE FOLLOWING CHANGE OF THE TO REACH.  
AA3717'FOLLOW MAIN ROAD FROM THE CHURCH MENTIONED IN THE ORIGINAL DESCRIPTION  
AA3717'FOR 3600 FT (1097.3 M) TURN RIGHT INTO THE WHARF ENTRANCE AND HEAD OUT  
AA3717'TO THE SEA WALL. PACK 100 FT (30.5 M) ESE ALONG SEAWALL TO STATION.  
\*\*\* retrieval complete.  
Elapsed Time = 00:00:05

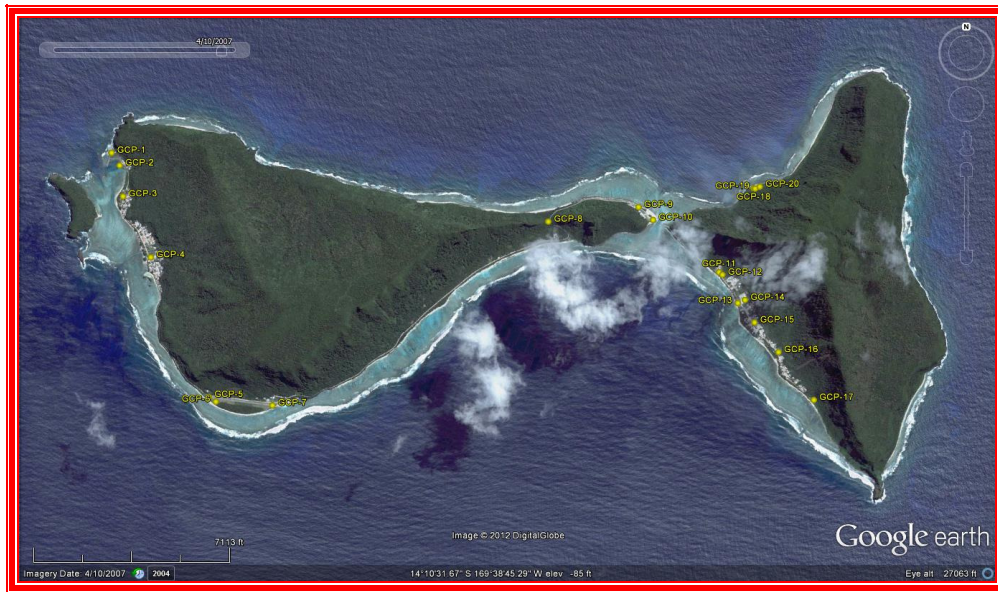
## IV.

## Final GCP's Coordinates Summary

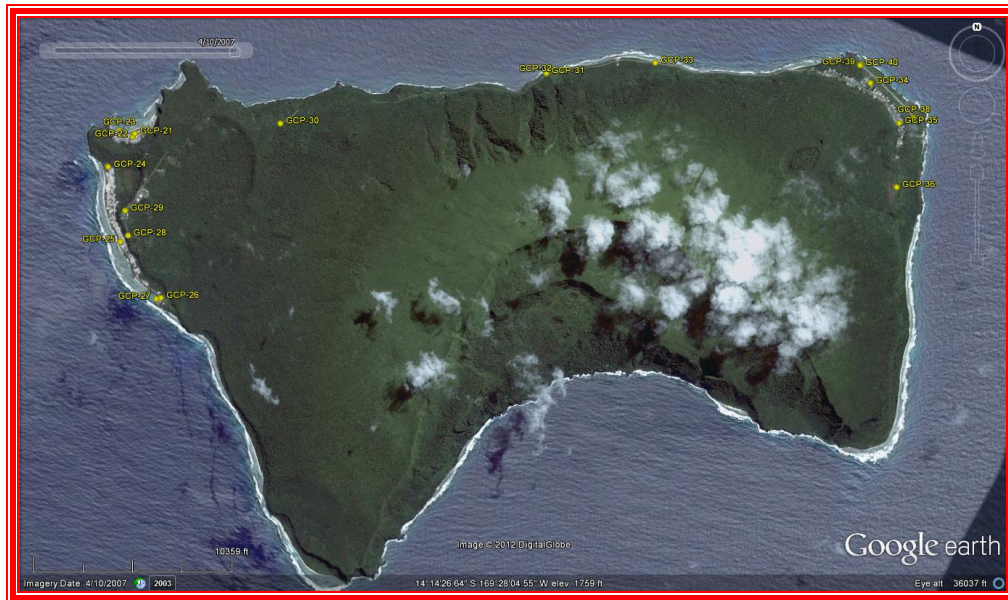
Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Description
GCP-1	14°09'45.04092"S	169°40'54.10589"W	8433900.093085	642275.179214	3.877	CAP IN CON
GCP-2	14°09'49.04294"S	169°40'51.47266"W	8433776.672588	642353.439201	1.170	CAP IN CON
GCP-3	14°09'58.85579"S	169°40'50.35668"W	8433474.949995	642385.200185	2.576	CAP WITH 5/8" RB
GCP-4	14°10'18.12065"S	169°40'41.36270"W	8432881.447935	642651.521277	2.710	CAP IN CON
GCP-5	14°11'02.32935"S	169°40'22.51127"W	8431519.777060	643209.018933	3.502	PAINT STRIPE
GCP-6	14°11'03.79491"S	169°40'20.26799"W	8431474.360724	643276.018077	3.045	CAP WITH 5/8" RB
GCP-7	14°11'04.98563"S	169°40'01.86978"W	8431434.632766	643827.397507	3.539	PAINT STRIPE
GCP-8	14°10'06.96115"S	169°38'32.29736"W	8433202.209565	646523.185990	28.148	CAP IN CON
GCP-9	14°10'02.36407"S	169°38'03.06007"W	8433338.372386	647400.630310	2.771	CAP IN CON
GCP-10	14°10'06.35850"S	169°37'58.26103"W	8433214.787311	647543.803822	4.276	CAP IN CON
GCP-11	14°10'22.92154"S	169°37'36.89356"W	8432702.069407	648181.479174	4.801	CAP IN CON
GCP-12	14°10'23.71543"S	169°37'35.80446"W	8432677.482327	648213.989811	4.447	CAP WITH 5/8" RB
GCP-13	14°10'32.68723"S	169°37'30.74583"W	8432400.895886	648364.039731	3.859	5/8" RB
GCP-14	14°10'31.68752"S	169°37'28.43441"W	8432431.208615	648433.521766	2.356	CAP WITH 5/8" RB
GCP-15	14°10'38.81044"S	169°37'25.36601"W	8432211.786425	648524.231298	2.490	CAP IN CON
GCP-16	14°10'48.19290"S	169°37'17.67038"W	8431922.112266	648753.261996	3.691	CAP WITH 5/8" RB
GCP-17	14°11'03.29082"S	169°37'06.22556"W	8431456.139879	649093.655056	5.846	CAP WITH 5/8" RB
GCP-18	14°09'56.41011"S	169°37'25.71599"W	8433514.773371	648521.401441	3.164	CAP WITH 5/8" RB
GCP-19	14°09'56.54312"S	169°37'25.24368"W	8433510.602947	648535.539159	4.481	CAP WITH 5/8" RB
GCP-20	14°09'55.93153"S	169°37'23.75546"W	8433529.134250	648580.271547	4.453	CAP WITH 5/8" RB
GCP-21	14°13'15.85926"S	169°30'46.47738"W	8427312.384485	660453.206149	3.362	5/8" RB
GCP-22	14°13'17.10424"S	169°30'47.22129"W	8427274.267915	660430.661861	3.447	CAP WITH 5/8" RB
GCP-23	14°13'14.35300"S	169°30'53.26907"W	8427359.970246	660249.903309	1.512	CAP IN CON
GCP-24	14°13'29.48176"S	169°30'58.03013"W	8426895.964014	660104.219806	4.398	CAP IN CON
GCP-25	14°14'00.52522"S	169°30'52.73962"W	8425940.970923	660256.732855	5.300	CAP WITH 5/8" RB
GCP-26	14°14'23.74205"S	169°30'35.17315"W	8425224.140075	660778.737969	3.655	5/8" RB
GCP-27	14°14'24.14690"S	169°30'37.33670"W	8425212.113907	660713.805970	2.402	CAP IN CON
GCP-28	14°13'57.96154"S	169°30'49.32962"W	8426019.102429	660359.452873	34.723	CAP IN CON
GCP-29	14°13'47.71009"S	169°30'50.46965"W	8426334.353399	660327.288432	47.305	5/8" RB
GCP-30	14°13'12.43272"S	169°29'43.22051"W	8427405.519736	662350.173877	130.259	CAP IN CON
GCP-31	14°12'50.75630"S	169°27'50.69849"W	8428049.669684	665727.746503	11.235	5/8" RB



GCP-32	14°12'49.79980"S	169°27'46.09783"W	8428078.155427	665865.863344	9.683	CAP IN CON
GCP-33	14°12'46.33836"S	169°27'04.07211"W	8428176.196920	667126.463788	4.599	CAP IN CON
GCP-34	14°12'55.01725"S	169°25'32.57857"W	8427891.120782	669867.592269	32.016	PK NAIL
GCP-35	14°13'11.44796"S	169°25'20.00919"W	8427383.630725	670240.998007	25.710	CAP WITH 5/8" RB
GCP-36	14°13'38.03437"S	169°25'21.59337"W	8426566.906030	670187.978465	48.247	5/8" RB
GCP-37	14°13'08.66405"S	169°25'12.99756"W	8427467.76204	670451.77780	31.833	PAINT STRIPE
GCP-38	14°13'09.05357"S	169°25'13.38844"W	8427455.87092	670439.97868	31.852	PAINT STRIPE
GCP-39	14°12'47.06055"S	169°25'36.27724"W	8428136.39117	669758.35800	31.739	PAINT STRIPE
GCP-40	14°12'47.34580"S	169°25'36.55826"W	8428127.68197	669749.87381	31.824	PAINT STRIPE



**OFU AND OLOSEGA FINAL GCP' s LAYOUT**



**TAU FINAL GCP' s LAYOUT**

# V. GCP's Adjustment Statistics and Report

## Project Summary

Project name: **RECAL OFU STATIC GCP 6-5-12.ttp**

Surveyor: **FW**

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **12**

Number of plane control points: **2**

Number of used GPS vectors: **32**

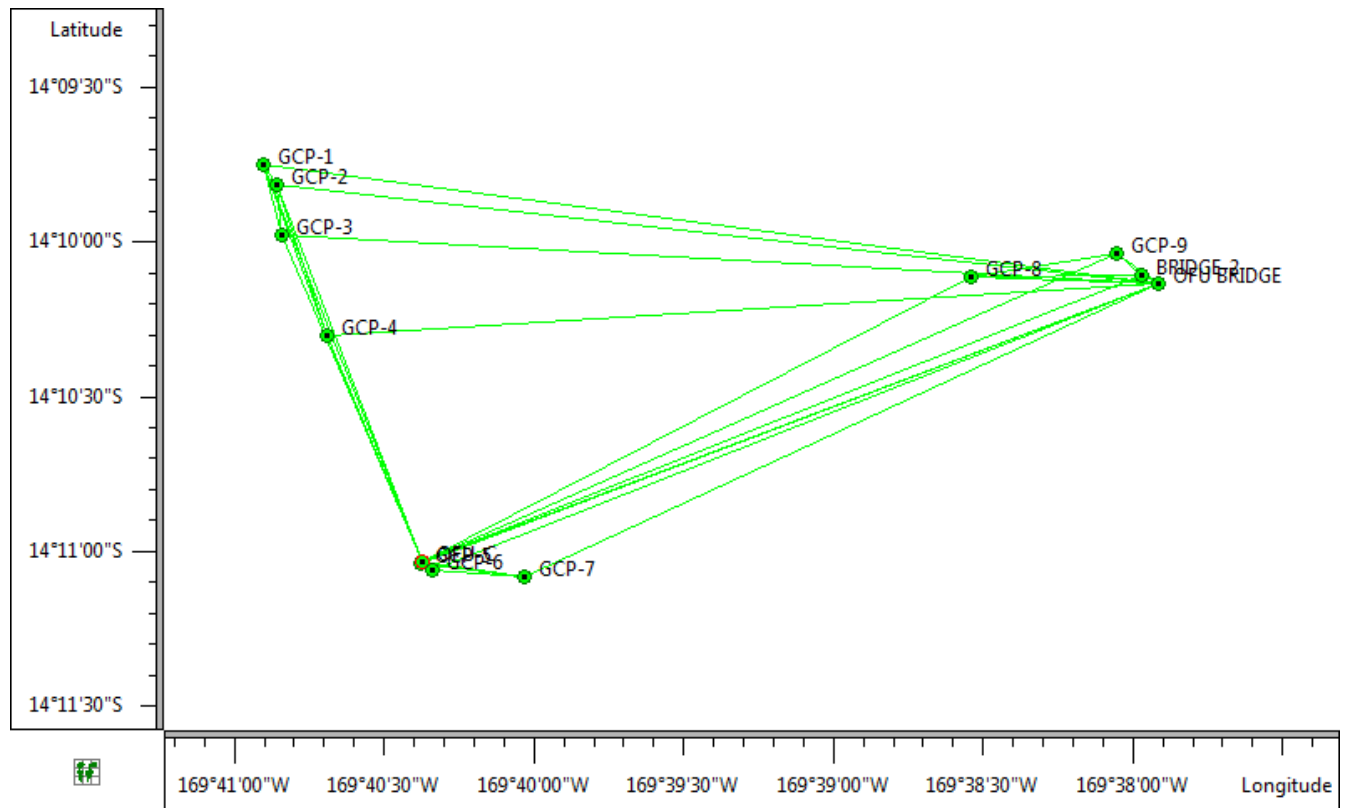
Number of rejected GPS vectors by plane: **12**

A posteriori plane UWE: **0.754715** , Bounds: ( **0.6924594** , **1.307096** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **11**

A posteriori height UWE: **0.5353897** , Bounds: ( **0.5892985** , **1.41164** )



GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-1-GCP-2	-123.421	78.260	-2.692	0.001	0.001
GCP-1-GCP-3	-425.142	110.020	-1.290	0.002	0.004
GCP-1-GCP-4	-1018.630	376.345	-1.111	0.013	0.031
GCP-1-OFU BRIDGE	-738.964	5375.910	1.425	0.003	0.006
GCP-1-OFU-C	-2372.940	945.196	-0.530	0.003	0.006
GCP-2-GCP-3	-301.723	31.760	1.408	0.002	0.004
GCP-2-GCP-4	-895.217	298.081	1.587	0.008	0.016
GCP-2-OFU BRIDGE	-615.543	5297.650	4.117	0.003	0.006
GCP-2-OFU-C	-2249.519	866.937	2.161	0.003	0.006
GCP-3-OFU BRIDGE	-313.821	5265.895	2.720	0.005	0.010
GCP-3-OFU-C	-1947.793	835.168	0.752	0.005	0.010
GCP-4-OFU BRIDGE	279.672	4999.559	2.548	0.005	0.011
GCP-4-OFU-C	-1354.291	568.854	0.582	0.004	0.007
GCP-5-GCP-6	-45.416	66.999	-0.460	0.001	0.002
GCP-5-GCP-7	-85.144	618.379	0.026	0.001	0.002
GCP-5-OFU BRIDGE	1641.339	4442.067	1.754	0.002	0.005
GCP-5-OFU-C	7.378	11.356	-0.201	0.001	0.001
GCP-6-GCP-7	-39.728	551.380	0.487	0.001	0.002
GCP-6-OFU BRIDGE	1686.756	4375.067	2.215	0.003	0.007
GCP-6-OFU-C	52.794	-55.644	0.261	0.001	0.002
GCP-7-OFU BRIDGE	1726.482	3823.689	1.732	0.002	0.005
GCP-7-OFU-C	92.521	-607.023	-0.223	0.001	0.002
GCP-8-GCP-9	136.163	877.444	-25.406	0.004	0.006
GCP-8-GCP-10	12.579	1020.620	-23.925	0.003	0.005
GCP-8-OFU BRIDGE	-41.077	1127.835	-22.813	0.004	0.006
GCP-8-OFU-C	-1675.062	-3302.880	-24.771	0.008	0.012

GCP-9-GCP-10	-123.585	143.173	1.485	0.001	0.002
GCP-9-OFU BRIDGE	-177.240	250.393	2.599	0.001	0.003
GCP-9-OFU-C	-1811.215	-4180.317	0.622	0.009	0.016
GCP-10-OFU BRIDGE	-53.654	107.219	1.110	0.001	0.001
GCP-10-OFU-C	-1687.621	-4323.491	-0.869	0.007	0.012
OFU BRIDGE-OFU-C	-1633.970	-4430.710	-1.962	0.003	0.005

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
OFU BRIDGE	14°10'08.08409"S	169°37'54.67470"W	5.386	BM
OFU-C	14°11'02.08718"S	169°40'22.13391"W	3.301	BM

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-10-OFU BRIDGE(6/5/2012 12:10:50 PM) GCP-10-OFU-C(6/5/2012 12:10:50 PM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.0034	0.0179	0.0566	0.0627	0.36	1.89	9484.8065
GCP-10-OFU BRIDGE(6/5/2012 12:10:50 PM) GCP-8-GCP-10(6/5/2012 12:10:50 PM) GCP-8-OFU BRIDGE(6/5/2012 12:00:50 PM)	0.0048	0.0018	0.0205	0.0266	2.11	0.81	2269.9961
GCP-1-GCP-3(6/5/2012 9:06:10 AM) GCP-1-GCP-2(6/5/2012 9:06:10 AM) GCP-2-GCP-3(6/5/2012 8:59:40 AM)	0.0013	0.0057	0.0136	0.0197	1.47	6.37	888.8417
GCP-1-GCP-4(6/5/2012 10:12:20 AM) GCP-1-GCP-2(6/5/2012 9:06:10 AM) GCP-2-GCP-4(6/5/2012 10:12:20 AM)	0.0077	0.0062	0.02	0.0261	3.54	2.86	2175.9614
GCP-1-OFU BRIDGE(6/5/2012 9:06:10 AM) GCP-1-GCP-2(6/5/2012 9:06:10 AM) GCP-2-OFU BRIDGE(6/5/2012 8:59:40 AM)	0.0005	0.0004	0.0637	0.0698	0.05	0.04	10907.4537



GCP-1-OFU BRIDGE(6/5/2012 9:06:10 AM) GCP-1-GCP-4(6/5/2012 10:12:20 AM) GCP-4-OFU BRIDGE(6/5/2012 10:12:20 AM)	0.0084	0.0115	0.0668	0.0728	0.73	1	11521.3941
GCP-1-OFU BRIDGE(6/5/2012 9:06:10 AM) GCP-1-GCP-3(6/5/2012 9:06:10 AM) GCP-3-OFU BRIDGE(6/5/2012 8:52:10 AM)	0.0042	0.0046	0.0649	0.071	0.38	0.42	11142.419
GCP-1-OFU BRIDGE(6/5/2012 9:06:10 AM) GCP-1-OFU-C(6/5/2012 9:06:10 AM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.0066	0.0062	0.0727	0.0788	0.52	0.49	12704.9196
GCP-1-OFU-C(6/5/2012 9:06:10 AM) GCP-1-GCP-2(6/5/2012 9:06:10 AM) GCP-2-OFU-C(6/5/2012 8:59:40 AM)	0.0004	0.0004	0.0347	0.0408	0.08	0.08	5111.9765
GCP-1-OFU-C(6/5/2012 9:06:10 AM) GCP-1-GCP-4(6/5/2012 10:12:20 AM) GCP-4-OFU-C(6/5/2012 10:12:20 AM)	0.0184	0.0012	0.0347	0.0408	3.6	0.24	5109.8593
GCP-1-OFU-C(6/5/2012 9:06:10 AM) GCP-1-GCP-3(6/5/2012 9:06:10 AM) GCP-3-OFU-C(6/5/2012 8:52:10 AM)	0.0095	0.0076	0.0347	0.0408	1.86	1.48	5113.4612
GCP-3-OFU BRIDGE(6/5/2012 8:52:10 AM) GCP-2-GCP-3(6/5/2012 8:59:40 AM) GCP-2-OFU BRIDGE(6/5/2012 8:59:40 AM)	0.0052	0.0107	0.0637	0.0698	0.48	0.98	10913.4583
GCP-3-OFU-C(6/5/2012 8:52:10 AM) GCP-2-GCP-3(6/5/2012 8:59:40 AM) GCP-2-OFU-C(6/5/2012 8:59:40 AM)	0.009	0.0015	0.0333	0.0394	1.85	0.31	4834.1959
GCP-4-OFU BRIDGE(6/5/2012 10:12:20 AM) GCP-2-GCP-4(6/5/2012 10:12:20 AM) GCP-2-OFU BRIDGE(6/5/2012 8:59:40 AM)	0.0096	0.0182	0.0656	0.0717	0.85	1.61	11285.7981
GCP-4-OFU-C(6/5/2012 10:12:20 AM) GCP-2-GCP-4(6/5/2012 10:12:20 AM) GCP-2-OFU-C(6/5/2012 8:59:40 AM)	0.0115	0.0078	0.0333	0.0394	2.39	1.63	4823.9587
GCP-5-GCP-7(6/5/2012 7:00:10 AM) GCP-5-GCP-6(6/5/2012 7:04:00 AM) GCP-6-GCP-7(6/5/2012 7:04:00 AM)	0.0005	0.0005	0.0154	0.0215	0.4	0.42	1258.148
GCP-5-GCP-7(6/5/2012 7:00:10 AM) GCP-5-OFU-C(6/5/2012 7:00:10 AM) GCP-7-OFU-C(6/5/2012 6:58:10 AM)	0.0007	0.0047	0.0154	0.0215	0.58	3.73	1251.9722
GCP-5-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-5-GCP-6(6/5/2012 7:04:00 AM) GCP-6-OFU BRIDGE(6/5/2012 7:19:48 AM)	0.0014	0.0002	0.0567	0.0628	0.15	0.03	9506.8312
GCP-5-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-5-OFU-C(6/5/2012 7:00:10 AM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.009	0.0062	0.0565	0.0626	0.95	0.65	9472.8655
GCP-5-OFU-C(6/5/2012 7:00:10 AM) GCP-5-GCP-6(6/5/2012 7:04:00 AM) GCP-6-OFU-C(6/5/2012 7:04:00 AM)	0.0013	0.0023	0.01	0.0161	7.73	13.3 7	171.2153
GCP-7-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-6-GCP-7(6/5/2012 7:04:00 AM) GCP-6-OFU BRIDGE(6/5/2012 7:19:48 AM)	0.003	0.0039	0.0563	0.0624	0.32	0.42	9438.4769

7:19:48 AM)							
GCP-7-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-7-OFU-C(6/5/2012 6:58:10 AM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.01	0.0072	0.0568	0.0629	1.05	0.75	9533.1528
GCP-7-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-5-GCP-7(6/5/2012 7:00:10 AM) GCP-5-OFU BRIDGE(6/5/2012 7:19:48 AM)	0.0019	0.0037	0.0569	0.063	0.2	0.38	9556.5419
GCP-7-OFU-C(6/5/2012 6:58:10 AM) GCP-6-GCP-7(6/5/2012 7:04:00 AM) GCP-6-OFU-C(6/5/2012 7:04:00 AM)	0.0014	0.0029	0.0154	0.0215	1.13	2.34	1243.7277
GCP-8-GCP-10(6/5/2012 12:10:50 PM) GCP-8-OFU-C(6/5/2012 12:00:50 PM) GCP-10-OFU-C(6/5/2012 12:10:50 PM)	0.0214	0.0228	0.056	0.0621	2.28	2.44	9366.9188
GCP-8-GCP-9(6/5/2012 12:04:30 PM) GCP-8-OFU-C(6/5/2012 12:00:50 PM) GCP-9-OFU-C(6/5/2012 12:04:30 PM)	0.0114	0.0124	0.0549	0.061	1.25	1.36	9148.8583
GCP-8-OFU BRIDGE(6/5/2012 12:00:50 PM) GCP-8-OFU-C(6/5/2012 12:00:50 PM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.0149	0.0031	0.0569	0.063	1.55	0.32	9555.9893
GCP-9-GCP-10(6/5/2012 12:10:50 PM) GCP-9-OFU-C(6/5/2012 12:04:30 PM) GCP-10-OFU-C(6/5/2012 12:10:50 PM)	0.0102	0.0062	0.0561	0.0622	1.09	0.66	9387.4608
GCP-9-GCP-10(6/5/2012 12:10:50 PM) GCP-8-GCP-9(6/5/2012 12:04:30 PM) GCP-8-GCP-10(6/5/2012 12:10:50 PM)	0.0024	0.0042	0.0196	0.0257	1.13	2	2098.7104
GCP-9-GCP-10(6/5/2012 12:10:50 PM) GCP-9-OFU BRIDGE(6/5/2012 12:04:30 PM) GCP-10-OFU BRIDGE(6/5/2012 12:10:50 PM)	0.0014	0.0031	0.0122	0.0183	2.29	5.06	615.9056
GCP-9-OFU BRIDGE(6/5/2012 12:04:30 PM) GCP-9-OFU-C(6/5/2012 12:04:30 PM) OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM)	0.0055	0.0149	0.0571	0.0632	0.57	1.55	9586.3421
GCP-9-OFU BRIDGE(6/5/2012 12:04:30 PM) GCP-8-GCP-9(6/5/2012 12:04:30 PM) GCP-8-OFU BRIDGE(6/5/2012 12:00:50 PM)	0.0023	0.0055	0.0208	0.0269	0.99	2.36	2324.2205
OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM) GCP-2-OFU BRIDGE(6/5/2012 8:59:40 AM) GCP-2-OFU-C(6/5/2012 8:59:40 AM)	0.0059	0.0062	0.0715	0.0776	0.48	0.5	12468.2467
OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM) GCP-4-OFU BRIDGE(6/5/2012 10:12:20 AM) GCP-4-OFU-C(6/5/2012 10:12:20 AM)	0.0091	0.0041	0.0651	0.0712	0.81	0.37	11200.2609
OFU BRIDGE-OFU-C(6/5/2012	0.0162	0.006	0.0697	0.0758	1.34	0.5	12118.6426

7:19:48 AM) GCP-3-OFU BRIDGE(6/5/2012 8:52:10 AM) GCP-3-OFU-C(6/5/2012 8:52:10 AM)							
OFU BRIDGE-OFU-C(6/5/2012 7:19:48 AM) GCP-6-OFU BRIDGE(6/5/2012 7:19:48 AM) GCP-6-OFU-C(6/5/2012 7:04:00 AM)	0.0086	0.0082	0.0566	0.0627	0.9	0.87	9489.3845

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-1	14°09'45.04092"S	169°40'54.10589"W	3.832	BM
GCP-2	14°09'49.04294"S	169°40'51.47266"W	1.140	BM
GCP-3	14°09'58.85579"S	169°40'50.35668"W	2.545	BM
GCP-4	14°10'18.12065"S	169°40'41.36270"W	2.720	BM
GCP-5	14°11'02.32935"S	169°40'22.51127"W	3.500	BM
GCP-6	14°11'03.79491"S	169°40'20.26799"W	3.040	BM
GCP-7	14°11'04.98563"S	169°40'01.86978"W	3.526	BM
GCP-8	14°10'06.96115"S	169°38'32.29736"W	28.198	BM
GCP-9	14°10'02.36407"S	169°38'03.06007"W	2.789	BM
GCP-10	14°10'06.35850"S	169°37'58.26103"W	4.275	BM

## Project Summary

Project name: **RECAL OFU STATIC GCP 6-6-12.ttp**

Surveyor: **FW**

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **12**

Number of plane control points: **2**

Number of used GPS vectors: **30**

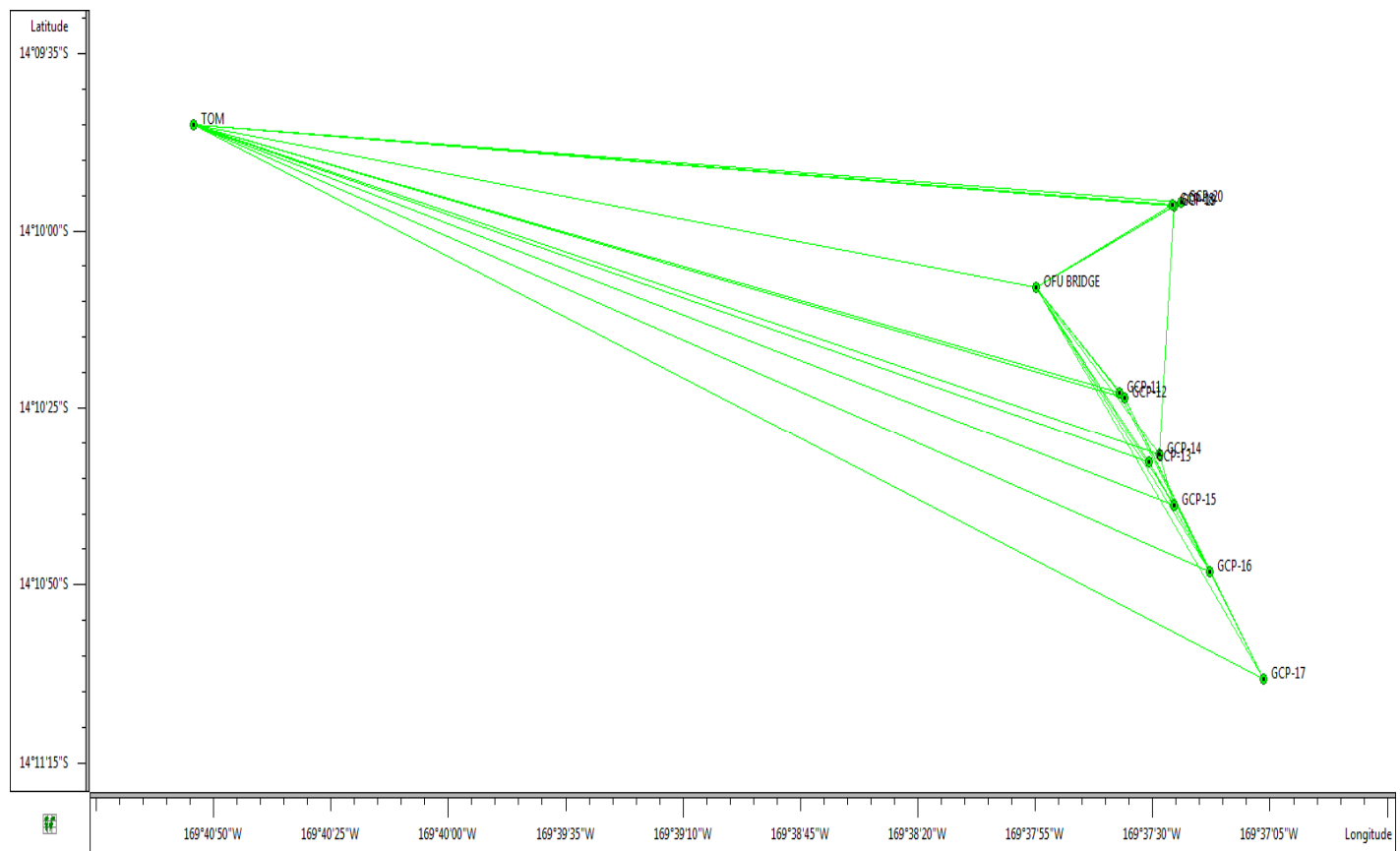
Number of rejected GPS vectors by plane: **12**

A posteriori plane UWE: **1.712928** , Bounds: ( **0.657172** , **1.342805** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **13**

A posteriori height UWE: **1.929089** , Bounds: ( **0.4913538** , **1.51233** )





GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-11-GCP-17	-1245.930	912.175	0.681417	0.002	0.003139
GCP-11-OFU BRIDGE	459.064	-530.456	0.617555	0.002	0.002820
GCP-11-TOM	1198.004	-5906.358	-0.797361	0.006	0.008338
GCP-12-GCP-16	-755.374	539.270	-0.794388	0.002	0.002620
GCP-12-GCP-17	-1221.337	879.671	1.004361	0.006	0.013105
GCP-12-OFU BRIDGE	483.654	-562.967	0.967526	0.001	0.002234
GCP-12-TOM	1222.599	-5938.866	-0.448110	0.004	0.008657
GCP-13-GCP-15	-189.110	160.194	-1.356612	0.001	0.001601
GCP-13-GCP-16	-478.781	389.222	-0.204540	0.001	0.002156
GCP-13-OFU BRIDGE	760.235	-713.020	1.575816	0.001	0.002142
GCP-13-TOM	1499.182	-6088.896	0.155577	0.006	0.010899
GCP-14-GCP-15	-219.418	90.708	0.129812	0.003	0.003472
GCP-14-GCP-19	1079.406	102.038	2.071108	0.026	0.036981
GCP-14-OFU BRIDGE	729.921	-782.497	3.075380	0.003	0.003571
GCP-14-TOM	1468.874	-6158.387	1.625290	0.008	0.010816
GCP-15-OFU BRIDGE	949.347	-873.208	2.927443	0.001	0.002171
GCP-15-TOM	1688.298	-6249.087	1.502840	0.005	0.008118
GCP-16-OFU BRIDGE	1239.021	-1102.240	1.764390	0.001	0.002885
GCP-16-TOM	1977.965	-6478.135	0.340970	0.005	0.010397
GCP-17-OFU BRIDGE	1704.994	-1442.632	-0.061583	0.002	0.003813
GCP-17-TOM	2443.934	-6818.536	-1.481926	0.006	0.008333
GCP-18-GCP-19	-4.170	14.139	1.309015	0.001	0.003623
GCP-18-GCP-20	14.360	58.869	1.291444	0.001	0.002222
GCP-18-OFU BRIDGE	-353.638	-870.380	2.276697	0.003	0.006911
GCP-18-TOM	385.288	-6246.250	0.823506	0.008	0.018373
GCP-19-OFU BRIDGE	-349.470	-884.514	0.973414	0.002	0.003851
GCP-19-TOM	389.458	-6260.368	-0.490582	0.009	0.015705
GCP-20-OFU BRIDGE	-368.003	-929.251	0.969787	0.003	0.006325
GCP-20-TOM	370.932	-6305.122	-0.482874	0.005	0.010409
OFU BRIDGE-TOM	738.944	-5375.887	-1.437554	0.003	0.005398

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
OFU BRIDGE	14°10'08.08409"S	169°37'54.67470"W	5.385827	
TOM	14°09'45.04076"S	169°40'54.10560"W	3.877064	

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-11-GCP-17(6/6/2012 12:10:37 PM) GCP-11-OFU BRIDGE(6/6/2012 12:03:00 PM) GCP-17-OFU BRIDGE(6/6/2012 12:10:37 PM)	0.0004	0.0023	0.0315	0.0376	0.09	0.51	4479.6685
GCP-11-GCP-17(6/6/2012 12:10:37 PM) GCP-11-TOM(6/6/2012 12:06:50 PM) GCP-17-TOM(6/6/2012 12:10:37 PM)	0.0029	0.0032	0.0832	0.0893	0.2	0.21	14816.1121
GCP-11-TOM(6/6/2012 12:06:50 PM) GCP-11-OFU BRIDGE(6/6/2012 12:03:00 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.0156	0.0226	0.0699	0.076	1.28	1.86	12156.2783
GCP-12-GCP-16(6/6/2012 1:30:23 PM) GCP-12-OFU BRIDGE(6/6/2012 1:06:40 PM) GCP-16-OFU BRIDGE(6/6/2012 1:30:23 PM)	0.0078	0.0025	0.0258	0.0319	2.34	0.74	3329.0877
GCP-12-GCP-17(6/6/2012 1:06:40 PM) GCP-12-OFU BRIDGE(6/6/2012 1:06:40 PM) GCP-17-OFU BRIDGE(6/6/2012 12:10:37 PM)	0.0071	0.0247	0.0316	0.0376	1.58	5.52	4481.3493
GCP-12-TOM(6/6/2012 1:06:40 PM) GCP-12-OFU BRIDGE(6/6/2012 1:06:40 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.0121	0.0219	0.0703	0.0764	0.99	1.79	12233.7419
GCP-15-OFU BRIDGE(6/6/2012 2:45:19 PM) GCP-14-GCP-15(6/6/2012 3:20:20 PM) GCP-14-OFU BRIDGE(6/6/2012 3:20:20 PM)	0.0086	0.0181	0.0221	0.0282	3.3	6.98	2597.7236
GCP-15-OFU BRIDGE(6/6/2012 2:45:19 PM) GCP-13-GCP-15(6/6/2012 2:45:19 PM) GCP-13-OFU BRIDGE(6/6/2012 2:15:10 PM)	0.0058	0.005	0.022	0.0281	2.25	1.93	2580.3303
GCP-15-TOM(6/6/2012 2:45:19 PM) GCP-14-GCP-15(6/6/2012 3:20:20 PM) GCP-14-TOM(6/6/2012 3:20:20 PM)	0.0098	0.0074	0.0744	0.0805	0.75	0.56	13043.5097
GCP-15-TOM(6/6/2012 2:45:19 PM) GCP-13-GCP-15(6/6/2012 2:45:19 PM) GCP-13-TOM(6/6/2012 2:15:10 PM)	0.0065	0.0094	0.0741	0.0802	0.5	0.72	12993.5223
GCP-15-TOM(6/6/2012 2:45:19 PM) GCP-15-OFU BRIDGE(6/6/2012 2:45:19 PM)	0.0101	0.013	0.0751	0.0812	0.77	0.98	13191.2657

OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)								
GCP-16-OFU BRIDGE(6/6/2012 1:30:23 PM) GCP-13-GCP-16(6/6/2012 2:15:10 PM) GCP-13-OFU BRIDGE(6/6/2012 2:15:10 PM)	0.0049	0.016	0.0257	0.0318	1.49	4.81	3318.0871	
GCP-16-TOM(6/6/2012 1:30:23 PM) GCP-13-GCP-16(6/6/2012 2:15:10 PM) GCP-13-TOM(6/6/2012 2:15:10 PM)	0.0171	0.0191	0.0775	0.0836	1.25	1.4	13663.035	
GCP-16-TOM(6/6/2012 1:30:23 PM) GCP-16-OFU BRIDGE(6/6/2012 1:30:23 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.0083	0.0141	0.0784	0.0845	0.6	1.02	13860.0698	
GCP-16-TOM(6/6/2012 1:30:23 PM) GCP-12-GCP-16(6/6/2012 1:30:23 PM) GCP-12-TOM(6/6/2012 1:06:40 PM)	0.0086	0.0053	0.078	0.0841	0.63	0.39	13766.7997	
GCP-17-TOM(6/6/2012 12:10:37 PM) GCP-17-OFU BRIDGE(6/6/2012 12:10:37 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.018	0.0172	0.0837	0.0898	1.21	1.15	14905.2024	
GCP-17-TOM(6/6/2012 12:10:37 PM) GCP-12-GCP-17(6/6/2012 1:06:40 PM) GCP-12-TOM(6/6/2012 1:06:40 PM)	0.0013	0.0295	0.0832	0.0893	0.09	1.99	14813.8864	
GCP-19-OFU BRIDGE(6/6/2012 3:59:15 PM) GCP-18-GCP-19(6/6/2012 4:38:40 PM) GCP-18-OFU BRIDGE(6/6/2012 4:38:40 PM)	0.0057	0.0057	0.0187	0.0248	3.01	3.01	1905.5774	
GCP-19-OFU BRIDGE(6/6/2012 3:59:15 PM) GCP-14-GCP-19(6/6/2012 3:59:15 PM) GCP-14-OFU BRIDGE(6/6/2012 3:20:20 PM)	0.0251	0.0309	0.0247	0.0308	8.08	9.94	3105.7614	
GCP-19-TOM(6/6/2012 3:59:15 PM) GCP-18-GCP-19(6/6/2012 4:38:40 PM) GCP-18-TOM(6/6/2012 4:38:40 PM)	0.0214	0.0051	0.0719	0.078	1.7	0.4	12547.135	
GCP-19-TOM(6/6/2012 3:59:15 PM) GCP-14-GCP-19(6/6/2012 3:59:15 PM) GCP-14-TOM(6/6/2012 3:20:20 PM)	0.0579	0.0448	0.0776	0.0837	4.23	3.27	13689.7206	
GCP-19-TOM(6/6/2012 3:59:15 PM) GCP-19-OFU BRIDGE(6/6/2012 3:59:15 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.0367	0.0264	0.0724	0.0785	2.9	2.09	12651.7142	
GCP-20-OFU BRIDGE(6/6/2012 5:05:07 PM) GCP-18-GCP-20(6/6/2012 5:05:07 PM) GCP-18-OFU BRIDGE(6/6/2012 4:38:40 PM)	0.0044	0.0155	0.0191	0.0252	2.2	7.73	1999.817	

GCP-20-TOM(6/6/2012 5:05:07 PM) GCP-18-GCP-20(6/6/2012 5:05:07 PM) GCP-18-TOM(6/6/2012 4:38:40 PM)	0.0056	0.0149	0.0723	0.0784	0.44	1.18	12636.5107
GCP-20-TOM(6/6/2012 5:05:07 PM) GCP-20-OFU BRIDGE(6/6/2012 5:05:07 PM) OFU BRIDGE-TOM(6/6/2012 12:06:50 PM)	0.0178	0.0151	0.0729	0.079	1.4	1.19	12743.6971
OFU BRIDGE-TOM(6/6/2012 12:06:50 PM) GCP-18-OFU BRIDGE(6/6/2012 4:38:40 PM) GCP-18-TOM(6/6/2012 4:38:40 PM)	0.0248	0.0156	0.0723	0.0784	1.97	1.24	12625.7943
OFU BRIDGE-TOM(6/6/2012 12:06:50 PM) GCP-14-OFU BRIDGE(6/6/2012 3:20:20 PM) GCP-14-TOM(6/6/2012 3:20:20 PM)	0.009	0.0125	0.0733	0.0794	0.7	0.98	12829.4483
OFU BRIDGE-TOM(6/6/2012 12:06:50 PM) GCP-13-OFU BRIDGE(6/6/2012 2:15:10 PM) GCP-13-TOM(6/6/2012 2:15:10 PM)	0.0108	0.0173	0.0729	0.0789	0.85	1.36	12741.2339

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-11	14°10'22.92154"S	169°37'36.89356"W	4.767658	
GCP-12	14°10'23.71543"S	169°37'35.80446"W	4.414972	
GCP-13	14°10'32.68723"S	169°37'30.74583"W	3.814484	
GCP-14	14°10'31.68752"S	169°37'28.43441"W	2.318624	
GCP-15	14°10'38.81044"S	169°37'25.36601"W	2.456265	
GCP-16	14°10'48.19290"S	169°37'17.67038"W	3.616563	
GCP-17	14°11'03.29082"S	169°37'06.22556"W	5.448363	
GCP-18	14°09'56.41011"S	169°37'25.71599"W	3.111128	
GCP-19	14°09'56.54312"S	169°37'25.24368"W	4.416467	
CP-20	14°09'55.93153"S	169°37'23.75546"W	4.404847	



## Project Summary

Project name: **RE CAL TAU GCP 6-11-12.ttp**

Surveyor:

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

## Adjustment Summary

Adjusted Components Count: **2**

Component Points: **GCP-24, TIDE GAGE ET, TAU-C, ...**

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **6**

Number of plane control points: **2**

Number of used GPS vectors: **9**

Number of rejected GPS vectors by plane: **4**

A posteriori plane UWE: **1.816818** , Bounds: ( **0.1590597** , **1.920937** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **5**

A posteriori height UWE: **1** , Bounds: ( **1** , **1** )

Component Points: **TAU C, TIDE GAGE-ET, GCP-34**

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **3**

Number of plane control points: **2**

Number of used GPS vectors: **3**

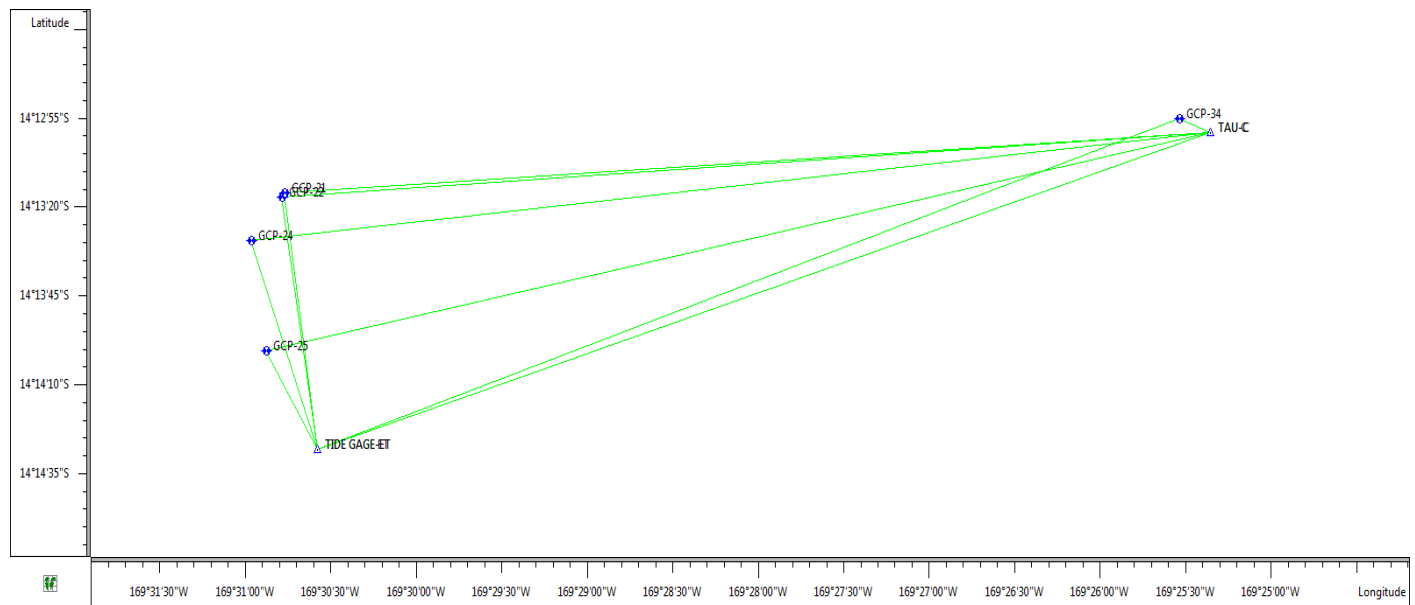
Number of rejected GPS vectors by plane: **2**

A posteriori plane UWE: **1** , Bounds: ( **1** , **1** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **2**

A posteriori height UWE: **1** , Bounds: ( **1** , **1** )



GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-21-TAU-C	457.135	9749.051	28.297917	0.006	0.011230
GCP-21-TIDE GAGE ET	-2227.940	338.419	-0.680180	0.004	0.009572
GCP-22-TAU-C	495.230	9771.573	28.193416	0.005	0.010802
GCP-22-TIDE GAGE ET	-2189.825	360.961	-0.777068	0.003	0.006115
GCP-24-TAU-C	873.558	10098.055	27.295596	0.005	0.011069
GCP-24-TIDE GAGE ET	-1811.519	687.405	-1.699258	0.003	0.006784
GCP-25-TAU-C	1828.530	9945.537	26.343136	0.004	0.007173
GCP-25-TIDE GAGE ET	-856.526	534.892	-2.609638	0.002	0.003812
GCP-34-TAU C	-121.628	334.638	0.421029	0.000	0.001173
GCP-34-TIDE GAGE-ET	-2806.697	-9075.990	-28.539495	0.005	0.012628
TAU C-TIDE GAGE-ET	-2685.071	-9410.628	-28.958438	0.004	0.008949
TAU-C-TIDE GAGE ET	-2685.065	-9410.624	-28.968416	0.006	0.012015

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
TAU C	14°12'58.90124"S	169°25'21.38936"W	32.461000	
TIDE GAGE-ET	14°14'28.28498"S	169°30'34.71342"W	2.673000	

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-24-TIDE GAGE ET(6/12/2012 8:16:38 AM) GCP-24-TAU-C(6/12/2012 8:16:38 AM) TAU-C-TIDE GAGE ET(6/12/2012 8:13:47 AM)	0.0273	0.0264	0.1184	0.1245	1.25	1.21	21861.0373
TAU C-TIDE GAGE-ET(6/12/2012 4:30:51 PM) GCP-34-TAU C(6/12/2012 4:36:33 PM) GCP-34-TIDE GAGE-ET(6/12/2012 4:36:33 PM)	0.0014	0.0021	0.1074	0.1135	0.07	0.11	19643.6471
TAU-C-TIDE GAGE ET(6/12/2012 8:13:47 AM) GCP-25-TAU-C(6/12/2012 11:48:17 AM) GCP-25-TIDE GAGE ET(6/12/2012 11:48:17 AM)	0.0213	0.0157	0.1137	0.1198	1.02	0.75	20909.6871
TAU-C-TIDE GAGE ET(6/12/2012 8:13:47 AM) GCP-21-TAU-C(6/12/2012 10:31:00 AM) GCP-21-TIDE GAGE ET(6/12/2012	0.011	0.0096	0.1181	0.1242	0.5	0.44	21800.9645

10:31:00 AM)							
TAU-C-TIDE GAGE ET(6/12/2012 8:13:47 AM) GCP-22-TAU-C(6/12/2012 9:25:51 AM) GCP-22-TIDE GAGE ET(6/12/2012 9:25:51 AM)	0.0164	0.0021	0.1181	0.1242	0.75	0.09	21791.196

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-21	14°13'15.85926"S	169°30'46.47738"W	3.353175	
GCP-22	14°13'17.10424"S	169°30'47.22129"W	3.450064	
GCP-24	14°13'29.48176"S	169°30'58.03013"W	4.372255	
GCP-25	14°14'00.52522"S	169°30'52.73962"W	5.282637	
GCP-34	14°12'55.01725"S	169°25'32.57857"W	32.039970	

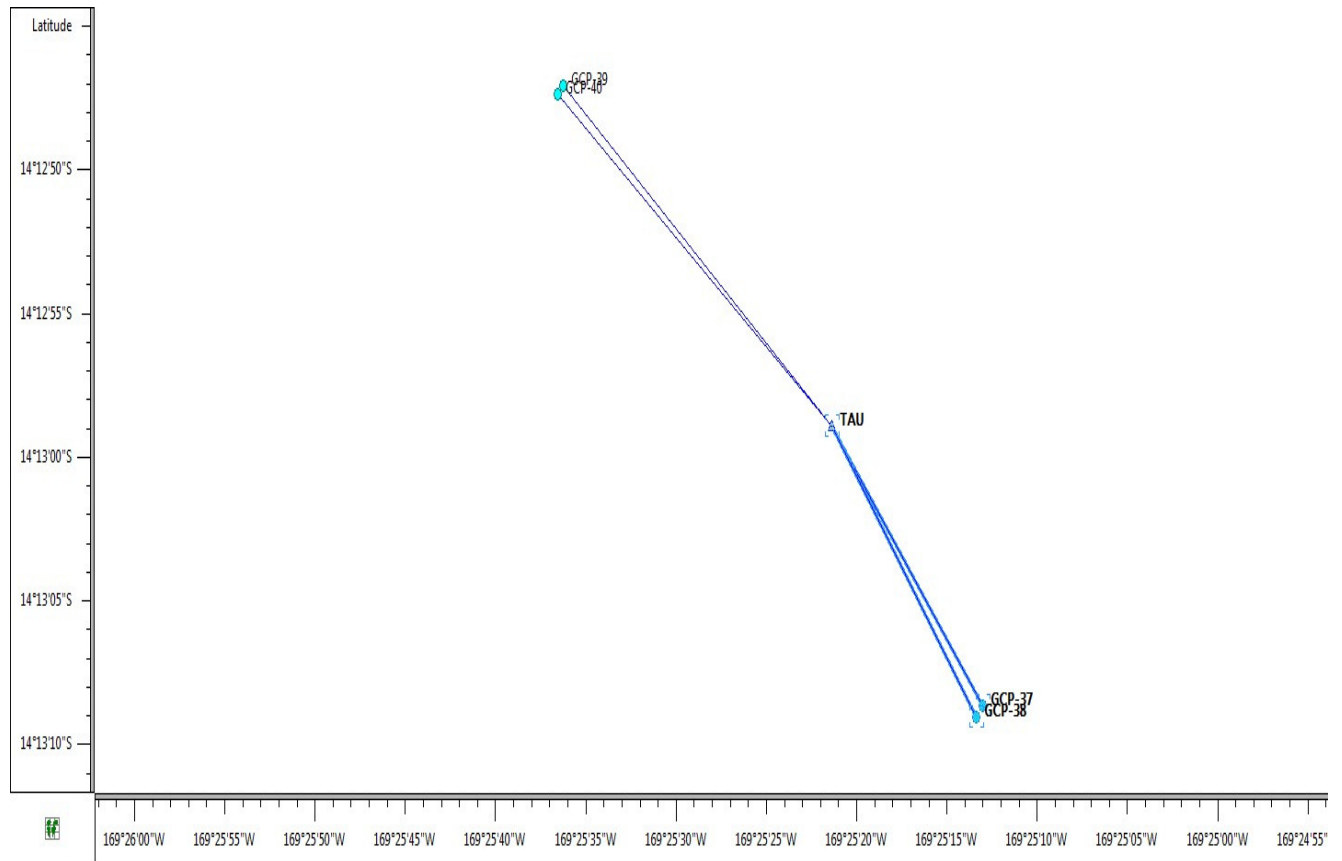
## Project Summary

Project name: RECAL RTK GCP AT TAU AIRPORT.ttp

Created by: FW

Comment: RTK SURVEY

Linear unit: Meters



## RTK Obs Quality

Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
TAU-GCP-37	-301.749	249.558	-0.671	0.005	0.008
TAU-GCP-38	-313.640	237.759	-0.644	0.005	0.008
TAU-GCP-39	366.876	-443.858	-0.600	0.006	0.013
TAU-GCP-40	358.167	-452.342	-0.704	0.005	0.009



### RTK Point Summary

Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-37	14°13'08.66405"S	169°25'12.99756"W	31.789	COR ZERO
GCP-38	14°13'09.05357"S	169°25'13.38844"W	31.812	COR3
GCP-39	14°12'47.06055"S	169°25'36.27724"W	31.861	COR1
GCP-40	14°12'47.34580"S	169°25'36.55826"W	31.757	COR2
TAU	14°12'58.90059"S	169°25'21.38978"W	32.461	BM

## Project Summary

Project name: **RECAL GCP-23.ttp**

Surveyor: **FW**

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **3**

Number of plane control points: **2**

Number of used GPS vectors: **3**

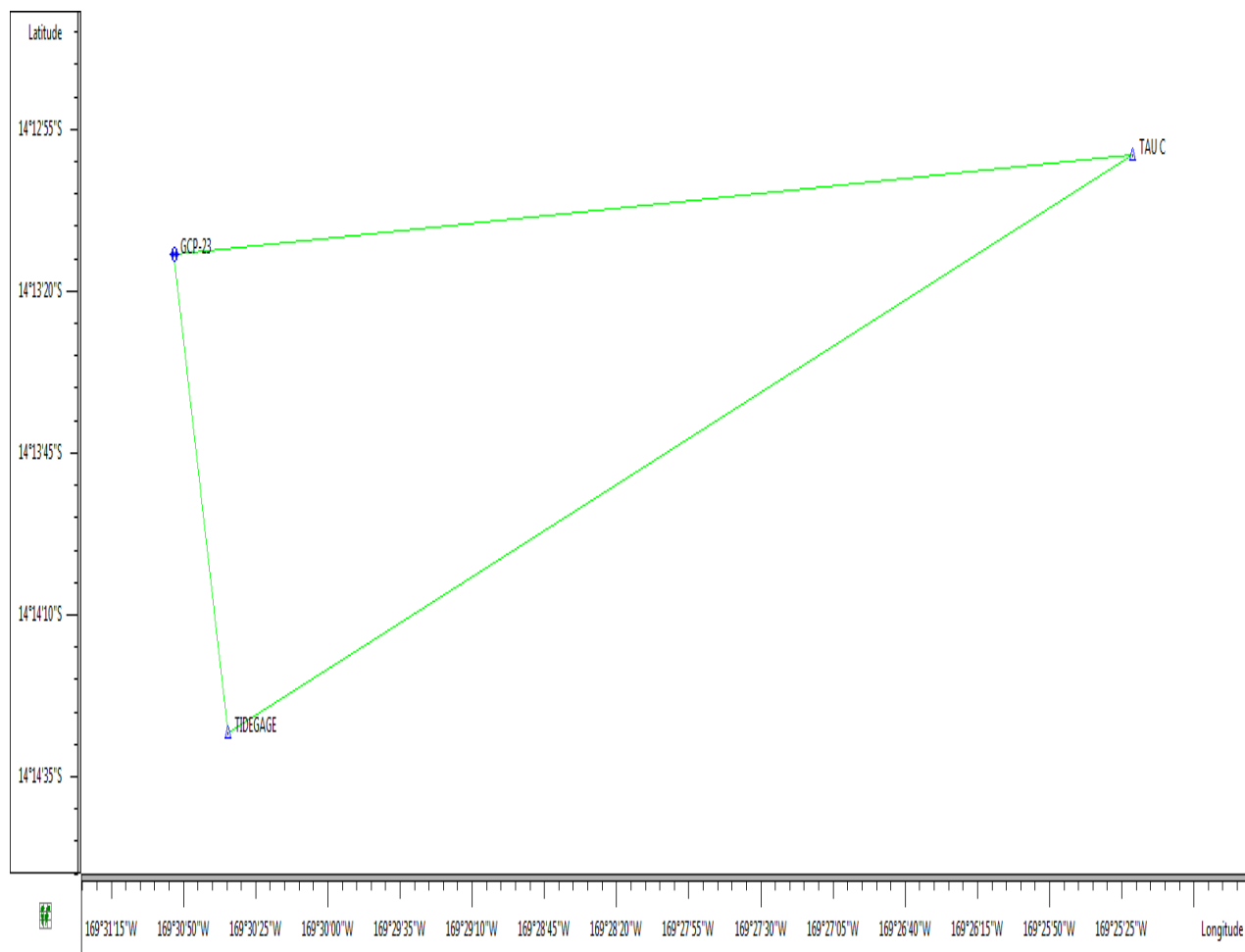
Number of rejected GPS vectors by plane: **1**

A posteriori plane UWE: **1.484435** , Bounds: ( **0.1590597** , **1.920937** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **2**

A posteriori height UWE: **1** , Bounds: ( **1** , **1** )



GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-23-TAU C	409.519	9952.334	30.152912	0.005	0.008511
GCP-23-TIDEGAGE	-2275.525	541.720	1.162537	0.002	0.004084
TAU C-TIDEGAGE	-2685.051	-9410.621	-29.011587	0.004	0.007245

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
TAU C	14°12'58.90124"S	169°25'21.38936"W	32.461265	
TIDEGAGE	14°14'28.28498"S	169°30'34.71342"W	2.673101	

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-23-TAU C(6/13/2012 10:48:20 AM) GCP-23-TIDEGAGE(6/13/2012 10:48:20 AM) TAU C-TIDEGAGE(6/13/2012 8:08:30 AM)	0.0111	0.0212	0.1196	0.1257	0.5	0.96	22087.602

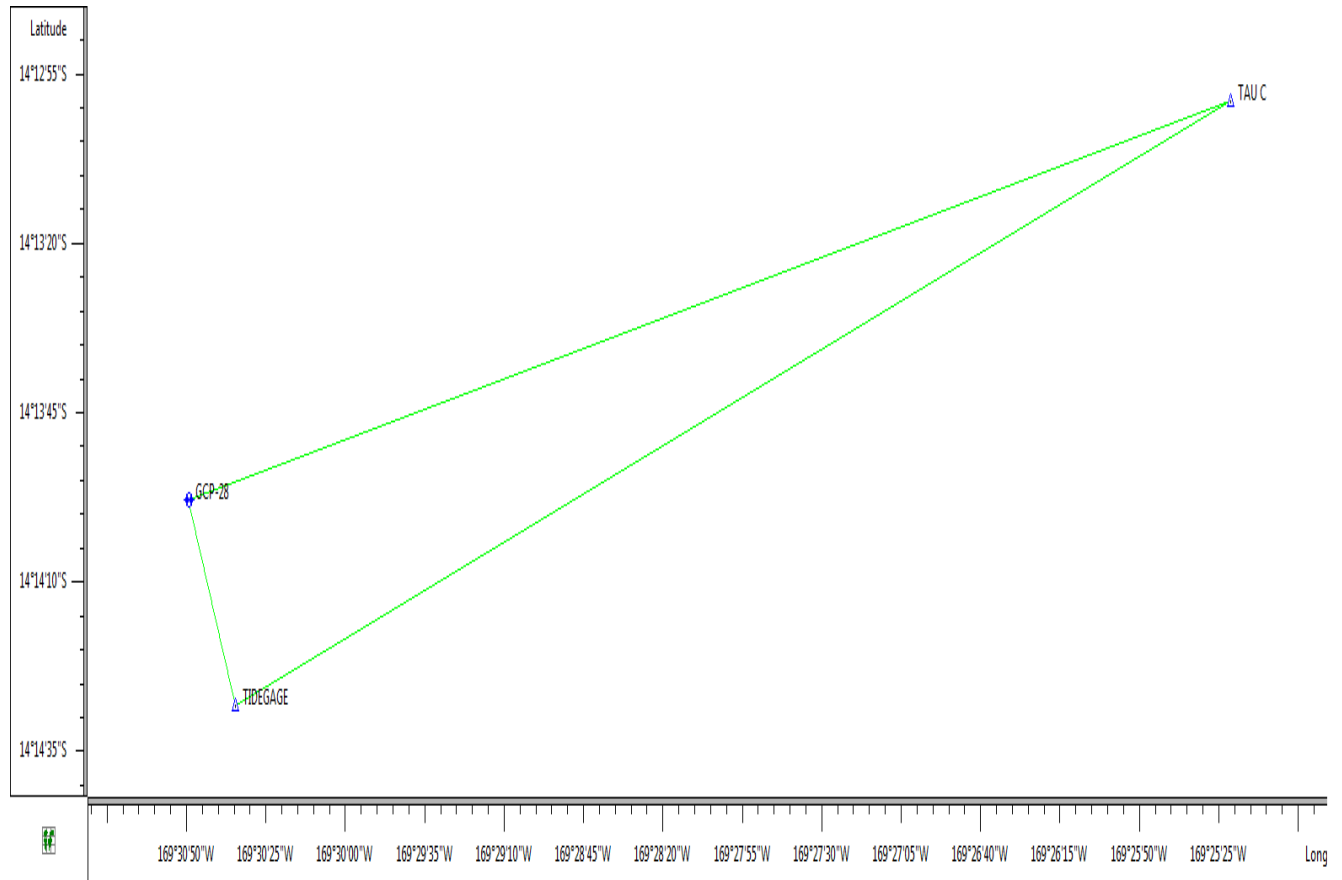
Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-23	14°13'14.35300"S	169°30'53.26907"W	1.510564	

## Project Summary

Project name: **GCP-28.ttp**  
Surveyor: **FW**  
Comment:  
Linear unit: **Meters**  
Projection: **UTMSouth-Zone\_2 : 174W to 168W**  
Geoid:

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **3**  
Number of plane control points: **2**  
Number of used GPS vectors: **3**  
Number of rejected GPS vectors by plane: **2**  
A posteriori plane UWE: **1** , Bounds: ( **1** , **1** )  
Number of height control points: **2**  
Number of rejected GPS vectors by height: **2**  
A posteriori height UWE: **1** , Bounds: ( **1** , **1** )





GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-28-TAU C	1750.405	9842.812	-3.028333	0.007	0.016669
GCP-28-TIDEGAGE	-934.658	432.172	-32.038503	0.003	0.008017
TAU C-TIDEGAGE	-2685.051	-9410.621	-29.011587	0.004	0.007245

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
TAU C	14°12'58.90124"S	169°25'21.38936"W	32.461265	
TIDEGAGE	14°14'28.28498"S	169°30'34.71342"W	2.673101	

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-28-TIDEGAGE(6/14/20 12 8:29:20 AM) GCP-28-TAU C(6/14/2012 8:29:20 AM) TAU C-TIDEGAGE(6/14/20 12 8:08:30 AM)	0.0206	0.0015	0.1132	0.1193	0.99	0.07	20815.0819

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
GCP-28	14°13'57.96154"S	169°30'49.32962"W	34.711604	

## Project Summary

Project name: **GCP-30.ttp**

Surveyor:

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

## Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **3**

Number of plane control points: **2**

Number of used GPS vectors: **3**

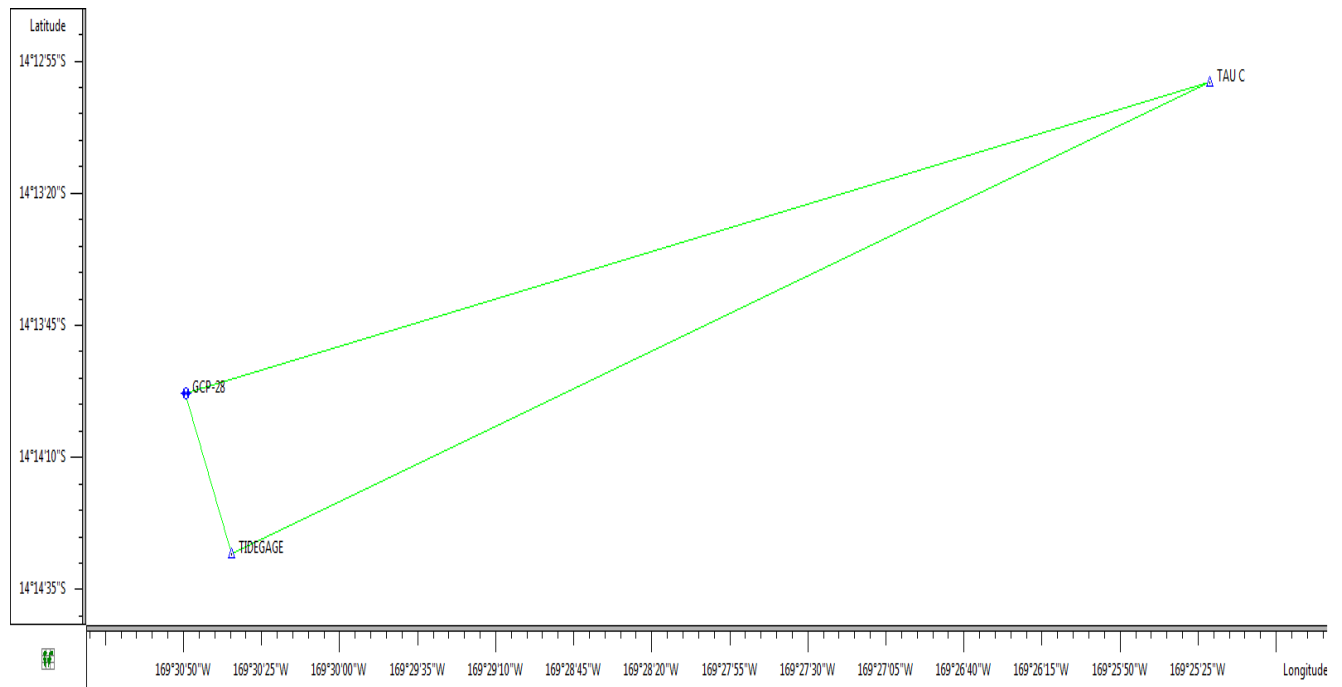
Number of rejected GPS vectors by plane: **2**

A posteriori plane UWE: **1** , Bounds: ( **1** , **1** )

Number of height control points: **2**

Number of rejected GPS vectors by height: **2**

A posteriori height UWE: **1** , Bounds: ( **1** , **1** )



GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
GCP-30-TAUC	363.973	7852.055	-98.487159	0.004	0.007275
GCP-30-TIDEGAGE	-2321.071	-1558.569	-127.463726	0.006	0.010031
TAUC-TIDEGAGE	-2685.048	-9410.637	-28.982735	0.003	0.006954

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
TAUC	14°12'58.90124"S	169°25'21.38936"W	32.461265	NGS
TIDEGAGE	14°14'28.28498"S	169°30'34.71342"W	2.673101	NGS

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
GCP-30-TIDEGAGE(6/14/2012 2:33:50 PM) GCP-30-TAUC(6/14/2012 2:33:50 PM) TAUC-TIDEGAGE(6/14/2012 8:51:10 AM)	0.0 123	0.00 62	0.1114	0.1175	0.6	0.3	20447.4704

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
CP-30	14°13'12.43272"S	169°29'43.22051"W	130.948437	

VI.

## Data Log Sheets with Photographs

# POB MAPPING SERVICES

### GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's OPERATOR: Galen, Wesley

COUNTY: Manu'a tele VILLAGE: Ofu

ANTENNA TYPE: GR3 RECEIVER SN : P8ELL1T7T34 PT#: GCP-1

ANTENNA HEIGHT: 2M START TIME: 9:06AM STOP TIME: 10:23AM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: OFU SEAWALL, MARK IS LOCATED ON THE NORTHEASTERLY  
CORNER OF SEAWALL.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-1**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: Wei, Kaisala

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8V3K8EPD80

PT#: GCP-2

ANTENNA HEIGHT: 2M

START TIME: 8:59AM

STOP TIME: 10:19AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: OFU WHARF, MARK IS LOCATED ON THE SOUTHWEST  
CORNER OF WHARF

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-2**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJK5TS

PT#: GCP-3

ANTENNA HEIGHT: 2M

START TIME: 8:52AM

STOP TIME: 9:54AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR WITH 2" CAP SET FLUSH WITH  
EXISTING GROUND

LOCATION: OFU VILLAGE CRICKET FIELD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-3**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's OPERATOR: Tai, Jr

COUNTY: Manu'a tele VILLAGE: Ofu

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJK5TS PT#: GCP-4

ANTENNA HEIGHT: 2M START TIME: 10:12AM STOP TIME: 11:27AM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: OFU VILLAGE, LOCATED ON THE SOUTH SIDE OF  
A VOLLEY BALL COURT.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-4**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: Galen, Wesley

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: P8ELL1TT34

PT#: GCP-5

ANTENNA HEIGHT: 2M

START TIME: 7:00AM

STOP TIME: 8:22AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PK NAIL SET IN CONCRETE.

LOCATION: OFU AIRPORT, MARK IS LOCATED ON THE WEST END  
OF OFU RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-5**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN R8V3KHEPDS0

PT#: GCP-6

ANTENNA HEIGHT: 2M

START TIME: 7:04AM

STOP TIME: 8:24AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND CAP

LOCATION: OFU AIRPORT, MARK IS LOCATED SOUTHEAST OF GCP-5  
AND IT'S ON GRASS AREA SOUTH OF OFU RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-6**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: R8V3KHEPD80

PT#: GCP-7

ANTENNA HEIGHT: 2M

START TIME: 6:50AM

STOP TIME: 8:32AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PK ANIL

LOCATION: OFU AIRPORT, MARK IS LOCATED ON THE EAST END OF  
RUNWAY

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-7**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: Ofu

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-8

ANTENNA HEIGHT: 2M START TIME: 12:00PM STOP TIME: 1:11PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: MAAFafa HILL, TARGET IS LOCATED ON CONCRETE ROAD

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-8**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR GALEN, WESLEY

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-9

ANTENNA HEIGHT: 2M

START TIME: 12:00PM

STOP TIME: 1:11PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: PAINTED TARGET IS LOCATED NORTHWEST OF ASAGA  
MOTEL AND IT'S ON EXISTING CONCRETE ROAD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-9**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/5/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8V3K8EPDSO

PT#: GCP-10

ANTENNA HEIGHT: 2M

START TIME: 12:10PM

STOP TIME: 12:58PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: PAINTED TARGET IS LOCATED SOUTHEAST OF ASAGA

MOTEL AND NORTHWEST OF ASAGA BRIDGE (OFU BRIDGE)

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-10**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-11

ANTENNA HEIGHT: 2M

START TIME: 12:03PM

STOP TIME: 1:03PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: PAINTED TARGET IS LOCATED ON THE NORTHWEST  
CORNER OF A CONCRETE DRIVEWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-11**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-12

ANTENNA HEIGHT: 2M

START TIME: 1:06PM

STOP TIME: 2:07PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: PAINTED TARGET IS LOCATED SOUTHEAST OF GCP-11  
AND IT'S ON GRASS AREA.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-12**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-13

ANTENNA HEIGHT: 2M

START TIME: 2:15PM

STOP TIME: 3:15PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: PAINTED TARGET IS LOCATED ON OLOSEGA ELEM. SCHOOL  
BALL COURT AND IT'S SOUTHWEST OF SCHOOL COMPOUND.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-13**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-14

ANTENNA HEIGHT: 2M

START TIME: 3:20PM

STOP TIME: 4:20PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP

LOCATION: OLOSEGA ELEM. SCHOOL, CONTROL POINT IS LOCATED  
ON THE MIDDLE OF SCHOOL FIELD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-14**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-15

ANTENNA HEIGHT: 2M

START TIME: 2:45PM

STOP TIME: 3:45PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE

LOCATION: PAINTED TARGET IS LOCATED SOUTHEAST OF OLOSEGA  
CCCAS CHURCH BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-15**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-16

ANTENNA HEIGHT: 2M

START TIME: 1:30PM

STOP TIME: 2:30PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: PAINTED TARGET IS LOCATED SOUTHEAST OF DIRT  
ROAD TO ASPA WATER TANK.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-16**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: OLOSEGA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-17

ANTENNA HEIGHT: 2M

START TIME: 12:10PM

STOP TIME: 1:10PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: PAINTED TARGET IS LOCATED AT THE SOUTHEAST END  
OF OLOSEGA VILLAGE AT THE LANDFILL AREA.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-17**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: TAI, JR

COUNTY: Manu'a tele

VILLAGE: SILI

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: GCP-18

ANTENNA HEIGHT: 2M

START TIME: 4:38PM

STOP TIME: 5:38PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: SILI, TARGET PANEL (TARP) IS SET AT THE END OF  
SILI DIRT ROAD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-18**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: SILI

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: GCP-19

ANTENNA HEIGHT: 2M

START TIME: 3:59PM

STOP TIME: 5:00PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: CONTROL POINT IS LOCATED SOUTHEAST OF GCP-18  
AND NORTHWEST OF THE FIRST HOUSE IN SILI.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-19**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/6/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: SILI

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWA0

PT#: GCP-20

ANTENNA HEIGHT: 2M

START TIME: 5:05M

STOP TIME: 6:05PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: TARGET IS LOCATED NORTH OF THE LAST HOUSE IN SILI  
AND NORTHEAST OF GCP-19.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-20**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FALEASAO

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-21

ANTENNA HEIGHT: 2M

START TIME: 10:31AM

STOP TIME: 11:31AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH EXISTING  
CONCRETE SLAB.

LOCATION: PAINTED TARGET IS LOCATED ON FALEASAO ELEM. SCHOOL  
BALL COURT, WEST OF FALEASAO CCCAS CHURCH BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-21**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FALEASAO

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-22

ANTENNA HEIGHT: 2M

START TIME: 9:25AM

STOP TIME: 10:26AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH THE GROUND.

LOCATION: CONTROL POINT IS LOCATED AT FALEASAO ELEM.

SCHOOL FIELD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-22**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/13/12

PROJECT: Manu'a Islands GCP's

OPERATOR GALEN, WESLEY

COUNTY: Manu'a tele

VILLAGE: FALEASAO

ANTENNA TYPE: GR3

RECEIVER SN : R8V3K8EPDSO

PT#: GCP-23

ANTENNA HEIGHT: 2M

START TIME: 10:48AM

STOP TIME: 11:48AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED ON THE NORTHEAST  
SECTION OF FALEASAO WHARF.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-23**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: TAU

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-24

ANTENNA HEIGHT: 2M

START TIME: 8:16AM

STOP TIME: 9:17AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED NORTHEAST OF TAU  
DISPENSARY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-24**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: TAU

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-25

ANTENNA HEIGHT: 2M

START TIME: 11:48AM

STOP TIME: 12:51AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR AND 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: PANEL TARGET (TARP) IS LOCATED SOUTHEAST OF  
TAU CATHOLIC CHURCH BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-25**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: TAU

ANTENNA TYPE: GR3 RECEIVER SN : R8LQJKQ5TS PT#: GCP-26

ANTENNA HEIGHT: 2M START TIME: 4:13PM STOP TIME: 5:46PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH THE GROUND.

LOCATION: PANEL TARGET (TARP) IS LOCATED NORTH OF M&O  
COMPOUND.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-26**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: TAU

ANTENNA TYPE: GR3 RECEIVER SN : R8LQJKQ5TS PT#: GCP-27

ANTENNA HEIGHT: 2M START TIME: 3:00PM STOP TIME: 4:01PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED AT THE CENTER OF TAU  
WHARF.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-27**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/14/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: TAU

ANTENNA TYPE: GR3 RECEIVER SN : R8LQJKQ5TS PT#: GCP-28

ANTENNA HEIGHT: 2M START TIME: 8:29AM STOP TIME: 9:29AM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED AT THE TURN-OFF TO  
THE OLD TAU AIRPORT ROAD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-28**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: TAU

ANTENNA TYPE: GR3 RECEIVER SN : R8LQJKQ5TS PT#: GCP-29

ANTENNA HEIGHT: 2M START TIME: 3:00PM STOP TIME: 4:01PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH EXISTING  
CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED NORTH OF AOG CHURCH  
BLDG AND SOUTHEAST OF TAU ECE SCHOOL BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-29**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/14/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FALEASAO

ANTENNA TYPE: GR3

RECEIVER SN : R8V3K8EPDSO

PT#: GCP-30

ANTENNA HEIGHT: 2M

START TIME: 2:33PM

STOP TIME: 3:34PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED ON THE SOUTH SIDE OF  
A BRIDGE CULVERT CROSSING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-30**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/14/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: FITIUTA

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-31

ANTENNA HEIGHT: 2M START TIME: 1:22PM STOP TIME: 2:44PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH THE GROUND.

LOCATION: CONTROL POINT IS LOCATED WEST OF GCP-32, BETWEEN  
SHORELINE SHOULDER AND CONCRETE ROAD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-31**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: FITIUTA

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-32

ANTENNA HEIGHT: 2M START TIME: 12:11PM STOP TIME: 1:12PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED ON THE NORTH SIDE OF  
CONCRETE ROAD, ALONG SIDE OF GUARD RAILS.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



**GCP-32**



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: FITIUTA

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-33

ANTENNA HEIGHT: 2M START TIME: 11:01AM STOP TIME: 12:03PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" CAP SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED ON THE CENTER OF  
CONCRETE ROAD, NORTHEAST OF FAGA WATER WELL SITE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-33**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FITIUTA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-34

ANTENNA HEIGHT: 2M

START TIME: 4:36PM

STOP TIME: 5:31PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PK NAIL SET IN CONCRETE.

LOCATION: PAINTED TARGET IS LOCATED ON FITIUTA AIRPORT  
PARKING LOT AND IT'S SOUTHWEST OF AIRPORT FIRE STATION  
BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



**GCP-34**



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: FITIUTA

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-35

ANTENNA HEIGHT: 2M START TIME: 9:46PM STOP TIME: 10:48AM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR WITH 2" CAP SET FLUSH WITH  
THE GROUND.

LOCATION: CONTROL POINT IS LOCATED SOUTH OF FITIUTA AOG  
CHURCH BLDG.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-35**

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 6/10/12

PROJECT: Manu'a Islands GCP's OPERATOR: TAI, JR

COUNTY: Manu'a tele VILLAGE: FITIUTA

ANTENNA TYPE: GR3 RECEIVER SN : R8LCQJKQ5TS PT#: GCP-36

ANTENNA HEIGHT: 2M START TIME: 8:38PM STOP TIME: 9:38AM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH THE GROUND.

LOCATION: PANEL TARGET (TARP) IS LOCATED AT THE FITIUTA  
QROCK QUARRY SITE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-36**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FITIUTA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-37

ANTENNA HEIGHT: 2M

START TIME: RTK

STOP TIME: RTK

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CONCRETE SURFACE

LOCATION: FITIUTA AIRPORT RUNWAY MARKINGS, IT'S THE  
SOUTHEAST CORNER OF THE #30.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-37**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FITIUTA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-38

ANTENNA HEIGHT: 2M

START TIME: RTK

STOP TIME: RTK

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CONCRETE SURFACE

LOCATION: FITIUTA AIRPORT RUNWAY MARKINGS, IT'S THE  
SOUTHWEST CORNER OF THE #30.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-38**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FITIUTA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-39

ANTENNA HEIGHT: 2M

START TIME: RTK

STOP TIME: RTK

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CONCRETE SURFACE

LOCATION: FITIUTA AIRPORT RUNWAY MARKINGS, IT'S THE  
NORTHEAST CORNER OF THE #12.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-39**

# POB MAPPING SERVICES

GPS DATA SHEET

DATE: 6/12/12

PROJECT: Manu'a Islands GCP's

OPERATOR: WEI, KAISALA

COUNTY: Manu'a tele

VILLAGE: FITIUTA

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: GCP-40

ANTENNA HEIGHT: 2M

START TIME: RTK

STOP TIME: RTK

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: EXISTING CONCRETE SURFACE

LOCATION: FITIUTA AIRPORT RUNWAY MARKINGS, IT'S THE  
SOUTHWEST CORNER OF THE #12.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





**GCP-40**



OLOSEGA ET

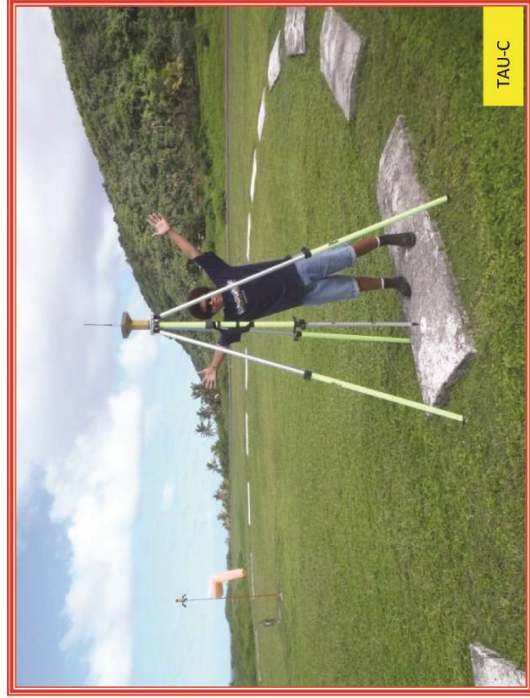


OFU-C



OFU BRIDGE

# BASE STATIONS



TAU-C



TIDE GAGE ET



# MANU'A AIRPORTS

## GROUND CONTROL POINTS SURVEY

PHOTO SCIENCE: Project #7525-055 & #7505-068

# 2012



OFU AND OLOSEGA

An aerial satellite-style photograph of two small, green islands in the Pacific Ocean. The islands are connected by a narrow isthmus. The water is a deep blue.

THE MANU'A  
ISLANDS

TAU

An aerial satellite-style photograph of a larger, green island with a prominent mountain peak. The island is surrounded by blue water.

OFU AIRPORT

A close-up aerial view of the Ofu Airport, showing a runway and taxiway along the coast of a lush green island. The water is turquoise.

FITIUTA AIRPORT

A close-up aerial view of the Fitiuta Airport, showing a runway and taxiway along the coast of a lush green island. The water is blue.

Presented by :

POB MAPPING SERVICES

NU'UULI, PAGO PAGO

AMERICAN SAMOA 96799

PROJECT: AMERICAN SAMOA IMAGERY

MANU'A AIRPORTS GCP COLLECTION ( PHASE-II )

LOCATION: AMERICAN SAMOA

MANU'A ISLANDS ( OFU AND TAU )

MAIN CONTRACTOR: PHOTO SCIENCE INC.

SURVEY SUB-CONSULTANT: POB MAPPING SERVICES

### Table of Contents

- I. Survey Summary Report
- II. Equipment Specifications
- III. NGS Network Data Sheets
- IV. Final GCP's Coordinates Summary
- V. GCP's Adjustment Statistics and Report
- VI. Data Log Sheets with Photographs

I.

SEPTEMBER 17, 2012.

## Survey summary report

POB Mapping Services was contracted by Photo Science Inc on July 18, 2012 to establish and survey 19 ground control points (GCP's), to support the Aerial Topographical LIDAR data and High Resolution Aerial Imagery for the two Airports on the Manu'a Islands in American Samoa. The Ofu Airport on the island of Ofu and Fitiuta Airport on the island of Tau.

Field survey was conducted from July 20<sup>th</sup> through July 25<sup>th</sup> 2012 and September 12<sup>th</sup> through September 15<sup>th</sup> 2012 by six POB Mapping Services survey crew. Horizontal controls for the 19 GCP's were established by using Static GPS method and adjusted to NGS control network dated 6-27-2012. Vertical controls were established by using differential leveling method (three wire reading) due to poor GPS elevations. All points were post process and check to meet its accuracies (95% confidence level) as stated in the SOW.

Ground Control Points throughout the two Airports (Ofu and Fitiuta) were either set with 2" brass caps set flush with the ground or hard surface, 5/8" rebar's driven flush with the ground, PK nails or existing survey markers and existing paint stripes on hard surfaces.

All survey panels were based on the paneling guidelines provide with the SOW. The Chevron shape was use throughout the entire project either by painting on existing hard surface or by laying the Chevron shape that was cut out of 5/8" plywood with panel size: 12" width and 4.5' total length (end to end).

POB Mapping Services Utilize TOPCON GR-3 GPS survey grade receivers for Static GPS data collections. A TOPCON AT-G2 automatic level with a 25 foot long fiberglass rod graduated in feet and tenths where use for differential leveling. Topcon Tools V.8 was the post processing software for Static GPS and RTK survey calculations.

All GCP points were documented with field photos showing the GPS set-up during data collections and field notes for differential leveling loops. Attached maps show GCP's approximate location and direction

where each target were pointing by referencing to true north. These 19 GCP's will be used for LIDAR calibration, imagery control and imagery accuracy.

Final GCP's are deliver in Universal Transverse Mercator (UTM), Zone\_2 South Projection with Horizontal Datum ( NAD83 ) as stated in the SOW. The main Horizontal Control Points for Ofu Airport were the NOS "OFU C" with an Orthometric Height of 3.300 meters or 10.83 feet which was also the set bench mark for elevation and control point "TOM". The Horizontal Control Points for Tau Airport were NOS "TAU C" with a set elevation of 32.307 meters of 105.60 feet and USGS "TIDE GAGE ET". All GCP's elevations for Tau Airport were based on differential leveling method from TAU ET Bench Mark with an Elevation of 0.59 meters or 1.94 feet.

### Main Control Points

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Description
OFU-C	14°11'02.08718"S	169°40'22.13391"W	8431527.154461	643220.374731	3.30	NOS SURVEY DISK
TOM	14°09'45.04076"S	169°40'54.10560"W	8433900.098016	642275.187901	3.849797	2" BRASS DISK SET IN CONCRETE SEAWALL
TAU-C	14°12'58.90124"S	169°25'21.38936"W	8427769.492892	670202.230312	32.461265	NOS SURVEY DISK
TIDE GAGE ET	14°14'28.28498"S	169°30'34.71342"W	8425084.444773	660791.624826	2.673101	USGS DISK



MAP SHOW MAIN CONTROL POINTS FOR THE MANUA ISLANDS AIRPORT SURVEY'S



# II. Equipment Specifications for GPS receivers and Automatic Level

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And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an install-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or asphalt leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

## The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

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**TOPCON CORPORATION**  
75 Hiranuma-cho, Maebashi-shi, Saitama 351-8501, Japan  
Phone: 81-3-3502-5100 Fax: 81-3-3502-5100

**Topcon Europe Positioning B.V.**  
Boulevard 11, 2001 LC Capelle aan den IJpolder, NL  
Phone: 31-20-465577 Fax: 31-20-465578

**Topcon Corporation Building Office**  
804 N. 1st St., Lansing, MI 48906, USA  
Topcon Development Lab, Beijing 100101, CHINA  
Tel: 86-10-7570-8700 Fax: 86-10-7570-8700



**Topcon Positioning Systems, Inc.**  
7420 National Drive  
Livemore, CA 94550  
www.topconpositioning.com

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## Basic Specifications

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signals Tracked:	GPS
	L1, L2, & L3 carrier, CA, L1 P, L2 P, L2 C
	L1, L2, & L3 carrier, L1 CA, L2 CA, L1 P, L2 P
	C2, L1, E5, E6
GLONASS	
GALILEO	
WAAS/EGNOS	Yes
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real time RTK accuracy	H: 10mm+1ppm
	V: 10mm+1ppm
Post processed Static DGPS	H: ±5.0mm+5.0ppm
	V: ±5.0mm+5.0ppm
<b>COMMUNICATIONS</b>	
Optional Radio Type	Integrated Tx/Rx 915MHz Spread Spectrum
Base Radio Output	0.250 - 1.0 Watts, selectable
Cellular Communications	Integrated via SIM Card, GSM/GPRS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update/Output Rate	1 - 20Hz Selectable
Real Time Data Output	TPS, RTCM SCOR, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External, Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium I-Beam Housing
Operating Temperature	-20 to +50C with Batteries
Environmental Specification	IP66 waterproof design
Shock Rating	2 meter pole drop

## The Leader in Positioning Technology...

Topcon Positioning Systems is the worldwide leading developer and manufacturer of precision positioning equipment and offers the widest selection of innovative precision GPS systems, laser, optical surveying, and machine control systems.

From open field construction projects to isolated surveying sites and from rolling farmland to inner city utility projects, Topcon Positioning Systems provides innovative technology that provides a decidedly competitive edge to end users.

The recognized innovator trend-setter in its industry, Topcon has focused on developing an array of integrated positioning and automation technologies to meet the constantly changing demands being construction, surveying, agriculture, utilities and law enforcement industries worldwide.

Your local authorized Topcon dealer is:

GR-3

TOPCON



## G3 ENABLED GNSS RECEIVER



### Advanced GPS+ Technology

- G3 SATELLITE TRACKING (GPS, GLONASS, GALILEO)
- ADVANCED RUGGED SYSTEM DESIGN
- BLUETOOTH WIRELESS TECHNOLOGY
- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION

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## It's time.

Topcon is proud to be the world leader in advanced satellite positioning technology. From our leadership with dual constellation GPS receivers, springs the next generation of satellite positioning technology - G3.

G3 is the first technology to combine all three satellite positioning systems - GPS, GLONASS, and the European Galileo system. In addition to adding the Galileo system to Topcon's industry leading GPS+GLONASS technology, the new G3 chip technology incorporates all the planned signal modernization of the GPS and GLONASS satellite systems, representing a system that is designed to track all available positioning satellite signals, available now or planned for the future!

The new G3 technology from Topcon ensures our users that a system they invest in today will still be fully operational far into the foreseeable future, eliminating the need to buy a new receiver as the new signals come on line. Only Topcon offers the Universal Tracking Technology found in the new G3 receiver system, demonstrating clear technology leadership.

Just imagine combining all the power of the new G3 tracking technology in a small, rugged field receiver. The new Topcon GR-3 receiver represents the next generation of advanced system design and tracking technology from Topcon, and truly sets new standards of performance, accuracy, and innovative receiver design. Offering advanced design features not found in other receivers, the GR-3's modern design provides the flexibility and ease-of-use you demand. Bluetooth technology provides G3 users with the advantages of a completely cable-free system setup, with any WinStar CE field controllers and the ultrarugged construction of the GR-3 is designed to take the punishment of any jobsite.

Topcon's GR-3 with its Universal Signal Tracking and a wide array of advanced design features is truly a revolutionary receiver, far ahead of any other receiver technology available!

Welcome to the next generation of satellite positioning technology!



**GR-3**  
G3 Enabled GNSS Receiver



## The new Topcon GR-3 represents the next generation in GPS+ receiver technology.



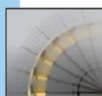
- G3 Tracking Technology**
- 72 "Universal" channels accept all current and planned satellite positioning signals
  - All GPS Signals
  - All Galileo Signals
  - All Galileo Signals



- Advanced System Design**
- Hot-Swappable Batteries
  - E-ION Rechargeable or Alkaline
  - Completely Cable-Free Design
  - Convenient Quick-Snap pole-mounting system



- Memory & Communication**
- Easy Access SD & SIM Cards
  - 915 MHz Spread Spectrum Radio
  - Optional Internal GPRS/GPRS
  - Bluetooth Wireless Technology



- Ultra Rugged Construction**
- Durable magnesium housing
  - I-Beam construction for added strength
  - Weatherproof design
  - Withstands 2(m) pole drop onto concrete
  - Environmentally sealed external ports

## Combine the GR-3 with a Topcon Controller!

- Topcon's FC Series Field Controllers
- Full color touch screen
- Graphical Windows interface
- Operates the full suite of Topcon field controller software packages
- Wireless operation via Bluetooth connection



## The GR-3 is the next generation RTK GPS system from Topcon. This exciting new system incorporates G3 tracking technology to track all three satellite positioning systems as well as new design features not found in any other system.



## Cable-Free Base & Rover Operation

- No hassles from broken cables
- Quick, easy setup & teardown
- Simple to learn to use
- All fits in one small hard sided case



## Dual Receiver Package Includes:

- Two GR-3 Receivers
- Charging Cradle
- PC Data Cables
- Hard Carry Case
- Radio Antennas
- Manuals & Utility software
- Field Height Tripod



## Accessories



**GMS-2 Dual-use Controller**  
Combine surveying and GIS location tasks with the optional GMS-2 controller. Navigate using the integrated GPS, then operate as an RTK controller connected to the GR-3.



**Optional Smart Charger**  
(Standard & Base or Rover/Receiver packages)  
Functions:  
• Charge Batteries  
• External Power Supply  
• Integrated Tripod Hook



**Topcon Tools Office Software Suite**  
Post processing raw GPS data, verification of RTK measurements or combining satellite data with terrestrial measurements. Topcon's Topcon Tool Software Suite provides unparalleled power and flexibility.



**Field Controller Software**  
**TopSURV**  
Topcon's professional survey Field Control Software.  
**Packet 3-D**  
Topcon's Field Software designed specifically for the contractor.

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There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

### The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

#### Offices Worldwide

**TOPCON CORPORATION**  
25-1 Hasegawa-cho, Sakai-shi • Tokyo 594-8501, Japan  
Phone: 3-3328-2320 • Fax: 3-3362-4214 • www.topcon.co.jp

**Topcon Europe Positioning B.V.**  
Duisenberg 12, 2004 LC Gorkeveld • Tel: 0031-1875-4201-8025  
Phone: 016-4585017 • Fax: 016-4585045 • www.topcon.eu.com

**Topcon Corporation Beijing Office**  
Block A, No. 5, Sanyuanli Street, Beijing Economic  
Technological Development Area, Beijing 100151 • CHINA  
Tel: +86-10-7802970 • Fax: +86-10-4392-2700



**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
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### Basic Specifications

<b>TRACKING</b>	
Number of Channels	72 Universal Channels
Signal Tracked:	
GPS	L1, L2, & L5 carrier, CA L1 P, L2 P, L2C
GLOPASS	L1, L2, & L5 carrier, L1CA, L1CA, L1 P, L2 P
GALILEO	E2-L1, E1, E5, E6
<b>WEATHER/COMMS</b>	
Antenna Type	Integrated Micro-Center on Flat Ground Plane
<b>ACCURACY</b>	
Real time RTK accuracy	H: 3mm±1ppm
	V: 10mm±1ppm
Post processed Static DGPS	H: ±3mm±0.5ppm
	V: ±5.0mm±0.5ppm
<b>COMMUNICATIONS</b>	
Optional Radio Type	Integrated 2x/2x 900MHz Spread Spectrum
Base Radio Output	0.25w - 1.0 Watts, selectable
Cellular Communications	Integrated via SIM Card, GSM/GPRS
Wireless Communications	Integrated Bluetooth version 1.1 comp
<b>DATA &amp; MEMORY</b>	
Memory	Internal, Removable SD Memory Card
Data Update Output Rate	1 - 20Hz, selectable
Real Time Data Output	TPS, RTCM SC104, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Control & Display Unit	Optional, External, Mobile Computer
<b>ENVIRONMENTAL</b>	
Enclosure	Magnesium & Alum Housing
Operating Temperature	-20 to +50°C with batteries
Environmental Specification	IP66 water proof dust proof
Shock Rating	2 meter pole drop

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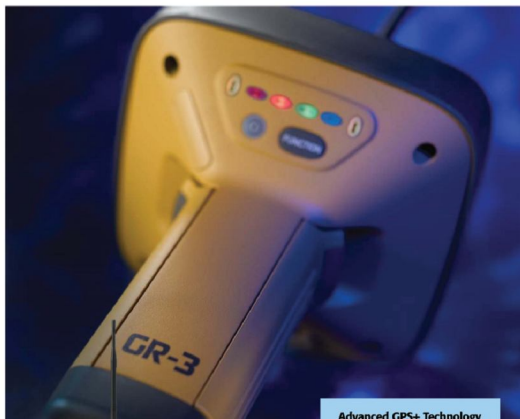
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### GR-3



### G3 ENABLED GNSS RECEIVER



#### Advanced GPS+ Technology

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- 72 UNIVERSAL TRACKING CHANNELS
- OPTIONAL INTERNAL GSM/GPRS CELLULAR COMMUNICATION



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### Specifications

	AT-G1	AT-G2/2A	AT-G3	AT-G4	AT-G6
<b>TELESCOPE</b>					
Length (in./mm)	9/229	9/229	9/230	7/192	7/193
Image	6mm/61	6mm/61	6mm/61	6mm/61	6mm/61
Magnification	32x	32x	30x	26x	24x
Objective lens (in./mm)	1.8/45	1.8/45	1.6/40	1.2/30	1.2/30
Relative brightness	1.98	1.98	1.29	1.53	1.56
Field of view	17°/17'	17°/17'	17°/30'	17°/30'	17°/30'
Resolving power	2.5"	2.5"	3.0"	3.5"	4.0"
Minimum focus (ft./m)	3.2/1.0	3.2/1.0	1.6/0.5	1.6/0.5	1.6/0.5
Stadia constant (in)	0	0	0	0	0
Stadia ratio	100	100	100	100	100
<b>CIRCULAR LEVEL</b>					
Sensativity (2mm)	8"	8"	8"	8"	8"
<b>AUTOMATIC LEVELING</b>					
Setting accuracy	±0.3"	±0.3"	±0.3"	±0.3"	±0.3"
Compensating range	±15'	±15'	±15'	±15'	±15'
<b>ACCURACY @ 100FT (30M)</b>					
w/o optical micrometer (in./mm)	-	-	-	±0.08/±2.0	±0.08/±2.0
<b>ACCURACY 1KM DOUBLE RUN LEVEL</b>					
w/o optical micrometer (in./mm)	±0.03/±0.7	±0.03/±0.7	±0.06/±1.5	±0.08/±2.0	±0.08/±2.0
with optical micrometer	±0.02/±0.4	±0.02/±0.4	±0.04/±1.0	N/A	N/A
<b>HORIZONTAL CIRCLE</b>					
Diameter (in./mm)	3.5/90	4.7/117	4.7/117	4.7/117	4.7/117
Minimum division	10' (0.1g)	1" (1g)	1" (1g)	1" (1g)	1" (1g)
<b>WEIGHT</b>					
Instrument (lbs./kgs.)	4.6/2.1	4.1/1.8	4.1/1.8	3.5/1.6	3.5/1.6
Plastic carrying case (lbs./kgs.)	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3

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**Topcon Corporation Beijing Office**  
Block A, No. 5, Sanyuanli Street, Beijing Economic  
Technological Development Area, Beijing 100151 • CHINA  
Tel: +86-10-7802970 • Fax: +86-10-4392-2700



**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
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### The Leader in Positioning Technology...

Your authorized Topcon dealer has the answer for all of your precise positioning needs. Whether you're looking for precision GPS+ control for surveying and engineering applications or layout and grade management on a construction job site, your local Topcon dealer offers the widest range of products to get the job done quickly and accurately.

And don't forget, Topcon also offers the industry's easiest-to-use GPS+ machine control systems. Capable of working as an in-vehicle-only system or fully automatic grade control, Topcon offers systems to automate your motorgrader, paver, profiler, dozer, excavator, or ag/land leveling machines.

There's only one company that offers you all of the positioning tools to keep you competitive in today's market. They're only available from your local dealer, and they're only from Topcon.

### The Leader in Customer Satisfaction...

To ensure that your Topcon system maintains peak performance, your local Topcon dealer offers factory trained and certified service technicians. And just in case service assistance isn't available in your area, our factory offers a repair and support policy second to none.

Your local Authorized Topcon dealer is:

### AT-G SERIES



### AT-G SERIES AUTO LEVELS



#### High accuracy, High value Auto Levels

- 6 MODELS - 24X TO 32X MAGNIFICATION
- WATERPROOF, DUSTPROOF CONSTRUCTION
- 2 SPEED FOCUS
- ANGULAR READING TO 10 MINUTES
- CLAMPLESS FINE HORIZONTAL ADJUSTMENTS
- VERY SHORT 0.5 METER FOCUSING
- AT-GLANCE LEVEL VIAL
- FAST, ACCURATE, AND STABLE LEVELING SYSTEM



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## It's time.

From Engineering to Construction, Topcon offers the industries most complete line of Auto-Levels. Topcon, the World Leader in precision survey optics, offers a complete line of high-accuracy, highly durable auto-levels that withstand the harsh environment of today's active job sites. All of Topcon's AT-G Series levels feature revolutionary magnetically dampened compensators that level faster with less sensitivity to vibration, a huge benefit when working near heavy equipment or active haul roads. And every AT-G model features Topcon's mylar suspension system, a World's First, that resists temperature induced errors associated with wire hung systems. AT-G's are also waterproof, dustproof and dry-nitrogen charged eliminating lens clouding and condensation during temperature fluctuations throughout the day, or when inclement weather moves in.

At Topcon we've keenly aware of the value of your time, and the trust you put in your equipment to increase productivity and profitability while maintaining accuracy and reliability, and Topcon's AT-G Series delivers. Set-up and leveling is fast and accurate using the level vial mirror. Simply flip the protective cap up and use the integrated tab to level while glancing at the mirror. You don't even need to move your eye from the instrument eyepiece. Then get on target quickly using the coarse and fine focusing knobs located conveniently on either side of the telescope. For precise angle measurement, 1° rotation marks are provided on the base with numeric indication every 10', up to a full 360°. The AT-G Series offers magnification powers from 24x to 32x for clear, precise shots over distance. The AT-G3, 4, and 6 even provide a super-short .5 meter focus for smaller sites.

**Green Label: high quality, high value from Topcon**  
Topcon is pleased to introduce Green Label. Green Label represents Topcon's commitment to supplying the Survey and Construction industries with the world's most cost effective, high quality positioning products. It's through Topcon's continued investment in state-of-the-art global engineering and manufacturing that Green Label is made possible. Green Label, the start of the next Topcon revolution. Topcon. It's time.



AT-G SERIES  
Auto Levels  
**TOPCON**

### Seven models to choose from, limitless applications, one thing in common: Topcon precision



**Waterproof/Dustproof construction**  
Completely waterproof and dustproof, the AT-G Series is ready to go to work whether it's dry and dusty, or cold and rainy. Even in damp conditions such as tunneling, they're in to the task.  
Each AT-G telescope is specially treated, then charged using dry nitrogen ensuring lens clouding and condensation won't be a problem with these levels.



**Angles made easy**  
**AT-G1 Only** Topcon's AT-G1 incorporates a 25x microscope and transparent horizontal circle containing numerical degree indications 360°. Get super accurate angle information in 10 arc-minutes, with a slight turn of the head.  
**AT-G2/2A/3/4/6:** The AT-G Series laser circle provides graduated angle indication clockwise from 1° to 360° (30 to 300) making angle measurements a snap. Values are indicated at 10° increments for a glance reference.



**Very short 1.65' (0.5m) focus**  
(AT-G1/AT-G4/AT-G6 only)  
Big jobs or small, close-in or across the bay. Topcon's AT-G Series feature a very short focus distance so you can set up where it's the most useful, and out of the way.



**Easy-to-see level vial**  
Level up without moving from the eyepiece. Using the integrated hinged mirror, simply tilt the mirror so the circular level vial is readable at eye height of the operator. You just use the attach base to center the circular level vial and level the AT-G with a slight shift of the eye. When not in use, keep the cap closed to protect vial and mirror from dirt and damage.

### New Ergonomic design

Redesigned for smoother, faster operation, Topcon's AT-G Series levels feature large, logically placed knobs, levers, accurate adjustments and lightweight materials for less weight when you're on the move.



### Topcon's automatic levels are compact, lightweight, and completely waterproof. From Engineering to construction, open field to tunneling, there's an AT-G made to fit you and your jobs.



**AT-G2A**  
32x magnification, 2-speed focus, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.



**AT-G2**  
32x magnification, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, 40x eyepiece adaptor, and illuminator for low ambient light conditions.



**AT-G3**  
32x magnification, easy-to-see level vial, and an impressive list of optional accessories including vertical eyepiece, optical micrometer, and illuminator for low ambient light conditions.



**AT-G4 Green Label**  
28x magnification, easy-to-see level vial, and short-range 0.5 meter focus.



**AT-G6 Green Label**  
24x magnification, easy-to-see level vial, and short-range 0.5 meter focus.

### Rapid, stable auto-leveling

A compensator does just that, it compensates for slight errors even local so readings are constant. Traditional wire-hung compensators have been proven to expand and contract at varying rates, fluctuating greatly throughout the day in the unit frames or coils. That's why Topcon introduced the World's first mylar suspended compensator. It's resistant to expansion and contraction providing unmatched accuracy throughout the day.  
But Topcon didn't stop there. All AT-G Series compensators also feature magnetic dampening, greatly speeding the "settling" of the unit after setup, and limiting vibrations due to heavy machine operation or traffic near the unit. Simply put, these are the most advanced, accurate and time-saving levels available, and they're only from Topcon!

### AT-G Series package

- Auto level
- Hard shell carry case
- Plumb bob
- Lens cleaning cloth
- Weather protective bag
- Allen wrench
- Operator's manual

### Accessories

Make your AT-G Series even more productive by adding these optional accessories. Contact your local Topcon Dealer for availability and pricing.



**Vertical Eyepiece**, Part # 53302  
Eliminate glare with a vertical 30° of your head. The vertical eye piece eliminates the bending and stooping that causes fatigue and pain after a long day in the field. (AT-G1/AT-G2/AT-G2A/AT-G3 only)



**Optical Micrometer**, Part # 56330 (ex. 56352 (2x), 56365 (4x))  
Add Topcon's optical micrometer to your AT-G Series and improve accuracy to ±.001" (External lens 3300" (10x) of double run leveling. It easily attaches to front, over the lens, with a counter weight attached to the eyepiece. (AT-G1/AT-G2/AT-G2A/AT-G3 only)



**Illuminator**, Part # 54308  
Topcon's Illuminator adds just enough light to the telescope to see target and angle reference marks in dark or night applications such as tunneling, or at night. (AT-G1/AT-G2/AT-G2A/AT-G3 only)



**40X Eyepiece**, Part # 56303  
Boost the magnification of your 32x AT-G Series auto level and easily by adding Topcon's 40x magnifier in place of the existing eyepiece. (AT-G1/AT-G2/AT-G2A/AT-G3 only)

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Specifications	AT-G1	AT-G2/2A	AT-G3	AT-G4	AT-G6
<b>TELESCOPE</b>					
Length (in./mm)	9/229	9/229	9/230	7/192	7/193
Image	69x41	69x41	69x41	69x41	69x41
Magnification	32x	32x	30x	26x	24x
Objective lens (in./mm)	1.8/45	1.8/45	1.6/40	1.2/30	1.2/30
Relative brightness	1.98	1.98	1.29	1.53	1.56
Field of view	17.6°	17.5°	17.3°	17.6°	17.5°
Resolving power	2.5"	2.5"	3.0"	3.5"	4.0"
Minimum focus (ft./m)	3.2/1.0	3.2/1.0	1.6/0.5	1.6/0.5	1.6/0.5
Stadia constant (m)	0	0	0	0	0
Stadia ratio	100	100	100	100	100
<b>CIRCULAR LEVEL</b>					
Sensibility (2 mm)	8"	8"	8"	8"	8"
<b>AUTOMATIC LEVELING</b>					
Setting accuracy	±0.3"	±0.3"	±0.3"	±0.3"	±0.3"
Compensating range	±15'	±15'	±15'	±15'	±15'
<b>ACCURACY @ 100ft. (30M)</b>					
W/o optical micrometer (in./mm)	-	-	-	±0.08/±2.0	±0.08/±2.0
<b>ACCURACY 1KM DOUBLE RUN LEVEL</b>					
W/o optical micrometer (in./mm)	±0.03/±0.7	±0.03/±0.7	±0.06/±1.5	±0.08/±2.0	±0.08/±2.0
With optical micrometer	±0.02/±0.4	±0.02/±0.4	N/A	N/A	N/A
<b>HORIZONTAL CIRCLE</b>					
Diameter (in./mm)	3.5/90	4.7/117	4.7/117	4.7/117	4.7/117
Minimum division	10' (0.1g)	1" (1g)	1" (1g)	1" (1g)	1" (1g)
<b>WEIGHT</b>					
Instrument (lbs./kgs.)	4.6/2.1	4.1/1.8	4.1/1.8	3.5/1.6	3.5/1.6
Plastic carrying case (lbs./kgs.)	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3	2.9/1.3

**Offices Worldwide**  
**TOPCON CORPORATION**  
7-1 Hozumi-cho, Atsugi-City • Tokyo 514-8601, Japan  
Phone: 3-3326-2531 • Fax: 3-3362-4214 • [www.topcon.co.jp](http://www.topcon.co.jp)  
**Topcon Europe Publishing B.V.**  
Gardiner 12, 1016 CA Amsterdam • The Netherlands  
Phone: 020-4880877 • Fax: 020-4880800 • [www.topcon.com](http://www.topcon.com)  
**Topcon Corporation Beijing Office**  
Block A, No. 1, Sanyuanli Street, Beijing East Gate  
Technology Development Area, Beijing 100101 • CHINA  
Tel: +86-10-6500-2719 • Fax: +86-10-6500-2716

**TOPCON**  
It's time.

**Topcon Positioning Systems, Inc.**  
7400 National Drive  
Livermore, CA 94550  
[www.topconpositioning.com](http://www.topconpositioning.com)

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**AT-G SERIES**

**WORLD'S FIRST**  
Technology

**AT-G SERIES AUTO LEVELS**

**High accuracy, High value Auto Levels**

- 6 MODELS - 24x TO 32x MAGNIFICATION
- WATERPROOF, DUSTPROOF CONSTRUCTION
- 2 SPEED FOCUS
- ANGULAR READING TO 10 MINUTES
- CLAMPLESS FINE HORIZONTAL ADJUSTMENTS
- VERY SHORT 0.5 METER FOCUSING
- 40x-GLANCE LEVEL VIAL
- FAST, ACCURATE, AND STABLE LEVELING SYSTEM

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### III.

## NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

DATABASE = NGSIDB , PROGRAM = datasheet95, VERSION = 7.89.1

1 National Geodetic Survey, Retrieval Date = JULY 18, 2012

AA4460 \*\*\*\*\*

AA4460 DESIGNATION - **OFU C**

AA4460 PID - AA4460

AA4460 STATE/COUNTY- AS/MANAU A (DISTRICT)

AA4460 COUNTRY - US

AA4460 USGS QUAD - MANUA ISLANDS (1963)

AA4460

AA4460 \*CURRENT SURVEY CONTROL

AA4460

AA4460\* NAD 83(PA11) POSITION- 14 11 02.08718(S) 169 40 22.13391(W) ADJUSTED

AA4460\* NAD 83(PA11) ELLIP HT- 34.805 (meters) (06/27/12) ADJUSTED

AA4460\* NAD 83(PA11) EPOCH - 2010.00

AA4460\* [LMSL](#) ORTHO HEIGHT - 3.3 (meters) 11. (feet) GPS OBS

AA4460

AA4460 LMSL orthometric height was determined with geoid model OSU 91A

AA4460 GEOID HEIGHT - 29.07 (meters) OSU 91A

AA4460 GEOID HEIGHT - 31.11 (meters) GEOID12

AA4460 NAD 83(PA11) X - -6,084,775.209 (meters) COMP

AA4460 NAD 83(PA11) Y - -1,108,773.704 (meters) COMP

AA4460 NAD 83(PA11) Z - -1,552,726.166 (meters) COMP

AA4460 LAPLACE CORR - -0.38 (seconds) DEFLECO9

AA4460

AA4460 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

AA4460 Type Horiz Ellip Dist(km)

AA4460

AA4460 NETWORK 3.50 10.90

AA4460

AA4460 MEDIAN LOCAL ACCURACY AND DIST (001 points) 1.00 10.90 0.62

AA4460

AA4460 NOTE: Click [here](#) for information on individual local accuracy

AA4460 values and other accuracy information.

AA4460

AA4460

AA4460.The horizontal coordinates were established by GPS observations

AA4460.and adjusted by the National Geodetic Survey in June 2012.

AA4460

AA4460.NAD 83(PA11) refers to NAD 83 coordinates where the reference

AA4460.frame has been affixed to the stable Pacific tectonic plate.

AA4460

AA4460.The horizontal coordinates are valid at the epoch date displayed above

AA4460.which is a decimal equivalence of Year/Month/Day.

AA4460

AA4460.The orthometric height was determined by GPS observations and a

AA4460.high-resolution geoid model.

AA4460

AA4460.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA4460

AA4460.The Laplace correction was computed from DEFLECO9 derived deflections.

AA4460

AA4460.The ellipsoidal height was determined by GPS observations

AA4460.and is referenced to NAD 83.

AA4460

AA4460. The following values were computed from the NAD 83(PA11) position.

AA4460

AA4460; North East Units Scale Factor Converg.

AA4460;UTM 02 - 8,431,527.155 643,220.375 MT 0.99985372 +0 19 30.9

AA4460

AA4460! - Elev Factor x Scale Factor = Combined Factor



AA4460!UTM 02 - 0.99999453 x 0.99985372 = 0.99984825  
AA4460  
AA4460 SUPERSEDED SURVEY CONTROL  
AA4460  
AA4460 NAD 83(2002)- 14 11 02.08647(S) 169 40 22.13441(W) AD(2002.00) 1  
AA4460 ELLIP H (04/01/03) 34.845 (m) GP(2002.00) 4 1  
AA4460 NAD 83(1993)- 14 11 02.07749(S) 169 40 22.13260(W) AD(1993.62) 1  
AA4460 ELLIP H (11/30/94) 35.291 (m) GP(1993.62) 5 1  
AA4460  
AA4460.Superseded values are not recommended for survey control.  
AA4460  
AA4460.NGS no longer adjusts projects to the AS datum.  
AA4460.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA4460  
AA4460\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK4322031527(NAD 83)  
AA4460  
AA4460\_MARKER: DD = SURVEY DISK  
AA4460\_SETTING: 0 = UNSPECIFIED SETTING  
AA4460\_SP\_SET: RUNWAY PAVEMENT  
AA4460\_STAMPING: OFU C 1993  
AA4460\_MARK LOGO: NGS  
AA4460\_MAGNETIC: 0 = OTHER; SEE DESCRIPTION  
AA4460\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY  
AA4460\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA4460+SATELLITE: SATELLITE OBSERVATIONS - 1993  
AA4460  
AA4460 HISTORY - Date Condition Report By  
AA4460 HISTORY - 1993 MONUMENTED NOS  
AA4460 HISTORY - 19950502 GOOD NGS  
AA4460  
AA4460 STATION DESCRIPTION  
AA4460  
AA4460'DESCRIBED BY NATIONAL OCEAN SERVICE 1993 (JGF)  
AA4460'THE STATION IS LOCATED ON THE ISLAND OF OFU, MANUA ISLANDS, AMERICAN  
AA4460'SAMOA, AT THE OFU AIRPORT. THE STATION IS 164 FT (50.0 M) NNW OF THE  
AA4460'RUNWAY 8 WINDSOCK, 29 FT (8.8 M) E OF THE W EDGE OF THE PAVEMENT, AND  
AA4460'29 FT (8.8 M) N OF THE CENTERLINE OF THE RUNWAY. THE STATION IS A  
AA4460'STANDARD NOS SURVEY DISK STAMPED -OFU C 1993- SET IN THE N SIDE OF THE  
AA4460'RUNWAY PAVEMENT AT RUNWAY 8 BEYOND THE THRESHOLD LIGHTS.  
AA4460  
AA4460 STATION RECOVERY (1995)  
AA4460  
AA4460'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995  
AA4460'THE STATION IS LOCATED IN THE WEST PART OF THE AIRPORT NEAR RWY END 8.  
AA4460'IT IS 29.2 FT (8.9 M) NORTH OF CL END RWY 8 (INTERSECTION OF EXPANSION  
AA4460'JOINTS AT CHISELED SQUARE), 0.9 FT (27.4 CM) WEST OF THE EXPANSION  
AA4460'JOINT LEADING NORTH FROM THE CL END AND 0.8 FT (24.4 CM) SOUTH OF THE  
AA4460'NORTH EDGE OF PAVEMENT. IT IS AN NOS DISK STAMPED OFU C 1993 SET IN A  
AA4460'DRILLHOLE FUSH WITH THE CONCRETE PAVEMENT.  
1 National Geodetic Survey, Retrieval Date = JULY 18, 2012  
AA3713

\*\*\*\*\*

# DATASHEETS

AA4465 DESIGNATION - **TAU C**

AA4465 PID - AA4465

AA4465 STATE/COUNTY- AS/MANAU A (DISTRICT)

AA4465 COUNTRY - US

AA4465 USGS QUAD - MANUA ISLANDS (1963)

AA4465

AA4465 \*CURRENT SURVEY CONTROL

AA4465

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AA4465\* NAD 83(PA11) POSITION- 14 12 58.90124(S) 169 25 21.38936(W) ADJUSTED

AA4465\* NAD 83(PA11) ELLIP HT- 62.473 (meters) (06/27/12) ADJUSTED

AA4465\* NAD 83(PA11) EPOCH - 2010.00

AA4465\* **LMSL** ORTHO HEIGHT - 32. (meters) 105. (feet) GPS OBS

AA4465

---

AA4465 LMSL orthometric height was determined with geoid model OSU 91A

AA4465 GEOID HEIGHT - 27.70 (meters) OSU 91A

AA4465 GEOID HEIGHT - 29.76 (meters) GEOID12

AA4465 NAD 83(PA11) X - -6,079,035.899 (meters) COMP

AA4465 NAD 83(PA11) Y - -1,135,178.111 (meters) COMP

AA4465 NAD 83(PA11) Z - -1,556,213.405 (meters) COMP

AA4465 LAPLACE CORR - 6.37 (seconds) DEFLEC09

AA4465

AA4465 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

AA4465 Type Horiz Ellip Dist(km)

AA4465 -----

AA4465 NETWORK 3.37 10.51

AA4465 -----

AA4465 MEDIAN LOCAL ACCURACY AND DIST (002 points) 0.66 10.51 0.37

AA4465 -----

AA4465 NOTE: Click [here](#) for information on individual local accuracy

AA4465 values and other accuracy information.

AA4465

AA4465

AA4465.The horizontal coordinates were established by GPS observations

AA4465.and adjusted by the National Geodetic Survey in June 2012.

AA4465

AA4465.NAD 83(PA11) refers to NAD 83 coordinates where the reference

AA4465.frame has been affixed to the stable Pacific tectonic plate.

AA4465

AA4465.The horizontal coordinates are valid at the epoch date displayed above

AA4465.which is a decimal equivalence of Year/Month/Day.

AA4465

AA4465.The orthometric height was determined by GPS observations and a

AA4465.high-resolution geoid model.

AA4465

AA4465.No vertical observational check was made to the station.

AA4465

AA4465.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AA4465

AA4465.The Laplace correction was computed from DEFLEC09 derived deflections.

AA4465

AA4465.The ellipsoidal height was determined by GPS observations

AA4465.and is referenced to NAD 83.

AA4465

AA4465. The following values were computed from the NAD 83(PA11) position.

AA4465

AA4465; North East Units Scale Factor Converg.

AA4465;UTM 02 - 8,427,769.493 670,202.230 MT 0.99995833 +0 23 14.9

AA4465

AA4465! - Elev Factor x Scale Factor = Combined Factor

AA4465!UTM 02 - 0.99999018 x 0.99995833 = 0.99994851

AA4465

AA4465: Primary Azimuth Mark Grid Az

AA4465:UTM 02 - TAU A 305 11 43.7

```

AA4465
AA4465 |-----|
AA4465 | PID Reference Object Distance Geod. Az |
AA4465 | dddmmss.s |
AA4465 | AA4464 TAU B 224.518 METERS 15251 |
AA4465 | AA4463 TAU A APPROX. 0.5 KM 3053458.6 |
AA4465 |-----|
AA4465
AA4465 SUPERSEDED SURVEY CONTROL
AA4465
AA4465 NAD 83(2002)- 14 12 58.90060(S) 169 25 21.38977(W) AD(2002.00) 1
AA4465 ELLIP H (04/01/03) 62.510 (m) GP(2002.00) 4 1
AA4465 NAD 83(1993)- 14 12 58.89155(S) 169 25 21.38801(W) AD(1993.62) 1
AA4465 ELLIP H (11/30/94) 62.948 (m) GP(1993.62) 5 1
AA4465
AA4465.Superseded values are not recommended for survey control.
AA4465
AA4465.NGS no longer adjusts projects to the AS datum.
AA4465.See file dsdata.txt to determine how the superseded data were derived.
AA4465
AA4465_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK7020227769(NAD 83)
AA4465
AA4465_MARKER: DD = SURVEY DISK
AA4465_SETTING: 0 = UNSPECIFIED SETTING
AA4465_SP_SET: SURROUNDED BY MASS OF CONCRETE
AA4465_STAMPING: TAU C 1993
AA4465_MARK LOGO: NGS
AA4465_MAGNETIC: 0 = OTHER; SEE DESCRIPTION
AA4465_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY
AA4465_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AA4465+SATELLITE: SATELLITE OBSERVATIONS - 1993
AA4465
AA4465 HISTORY - Date Condition Report By
AA4465 HISTORY - 1993 MONUMENTED NOS
AA4465 HISTORY - 19950502 GOOD NGS
AA4465
AA4465 STATION DESCRIPTION
AA4465
AA4465'DESCRIBED BY NATIONAL OCEAN SERVICE 1993 (JGF)
AA4465'THE STATION IS LOCATED NEAR MIDFIELD AT FITIUTA AIRPORT ON THE ISLAND
AA4465'OF TAU, MANUA ISLANDS, AMERICAN SAMOA, IN THE VILLAGE OF FITIUTA. THE
AA4465'STAITON IS LOCATED ON THE NE SIDE OF RUNWAY 12/30, IN THE NW SECTION
AA4465'OF A SEGMENTED WIND CIRCLE IN A CONCRETE BLOCK. THE STATION IS 129.0
AA4465'FT (39.3 M) NE OF THE NE EDGE OF THE RUNWAY, 69.6 FT (21.2 M) SW OF A
AA4465'CLUMP OF FUTU TREES ON THE CLIFF NE OF THE RUNWAY, AND 51.4 FT (15.7
AA4465'M) NW OF THE WINDSOCK. TO OBTAIN ACCESS TO THE STATION AND THE AIRPORT
AA4465'CONTACT THE FAA REPRESENTATIVE MR. TAUFU ESE E TE I, FITIUTA POST
AA4465'OFFICE, PAGO PAGO, AMERICAN SAMOA 96779. PHONE 684-677-3499/3418.
AA4465
AA4465 STATION RECOVERY (1995)
AA4465
AA4465'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995
AA4465'THE STATION IS LOCATED IN THE CENTRAL PART OF THE AIRPORT NORTHEAST OF
AA4465'RWY 12-30 AND AT A WINDSOCK SITE. IT IS 165.8 FT (50.5 M) NORTHEAST
AA4465'OF THE RUNWAY CENTERLINE AND 51.7 FT (15.8 M) NNW OF THE WINDSOCK
AA4465'POLE. IT IS SET IN ONE OF THE 3X8 FT CONCRETE PADS WHICH FORM THE
AA4465'SEGMENTED CIRCLE. THE STATION IS AN NOS DISK STAMPED TAU C 1993 SET
AA4465'IN A DRILLHOLE FLUSH WITH THE CONCRETE SURFACE 2 FT (0.6 M) WEST OF
AA4465'THE EAST END AND 1.5 FT (0.5 M) NORTH OF THE SOUTH EDGE.
1 National Geodetic Survey, Retrieval Date = JULY 18, 2012

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**DATASHEETS**

AA3717 DESIGNATION - **TIDE GAGE ET**

AA3717 PID - AA3717  
AA3717 STATE/COUNTY- AS/MANAU A (DISTRICT)  
AA3717 COUNTRY - US  
AA3717 USGS QUAD - MANUA ISLANDS (1963)  
AA3717  
AA3717 \*CURRENT SURVEY CONTROL  
AA3717  


---

AA3717\* NAD 83(PA11) POSITION- 14 14 28.28498(S) 169 30 34.71342(W) ADJUSTED  
AA3717\* NAD 83(PA11) ELLIP HT- 33.485 (meters) (06/27/12) ADJUSTED  
AA3717\* NAD 83(PA11) EPOCH - 2010.00  
AA3717\* ASVD02 ORTHO HEIGHT - 2.9 (meters) 10. (feet) GPS OBS  
AA3717  


---

AA3717 NAD 83(PA11) X - -6,080,061.695 (meters) COMP  
AA3717 NAD 83(PA11) Y - -1,125,814.465 (meters) COMP  
AA3717 NAD 83(PA11) Z - -1,558,869.120 (meters) COMP  
AA3717 LAPLACE CORR - 2.06 (seconds) DEFLEC09  
AA3717 GEOID HEIGHT - 30.59 (meters) GEOID12  
AA3717  
AA3717 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)  
AA3717 Type Horiz Ellip Dist(km)  
AA3717 -----  
AA3717 NETWORK 3.25 9.47  
AA3717 -----  
AA3717 MEDIAN LOCAL ACCURACY AND DIST (006 points) 0.78 9.47 9.78  
AA3717 -----  
AA3717 NOTE: Click [here](#) for information on individual local accuracy  
AA3717 values and other accuracy information.  
AA3717  
AA3717  
AA3717.The horizontal coordinates were established by GPS observations  
AA3717.and adjusted by the National Geodetic Survey in June 2012.  
AA3717  
AA3717.NAD 83(PA11) refers to NAD 83 coordinates where the reference  
AA3717.frame has been affixed to the stable Pacific tectonic plate.  
AA3717  
AA3717.The horizontal coordinates are valid at the epoch date displayed above  
AA3717.which is a decimal equivalence of Year/Month/Day.  
AA3717  
AA3717.The orthometric height was determined by GPS observations and a  
AA3717.high-resolution geoid model.  
AA3717  
AA3717.The X, Y, and Z were computed from the position and the ellipsoidal ht.  
AA3717  
AA3717.The Laplace correction was computed from DEFLEC09 derived deflections.  
AA3717  
AA3717.The ellipsoidal height was determined by GPS observations  
AA3717.and is referenced to NAD 83.  
AA3717  
AA3717. The following values were computed from the NAD 83(PA11) position.  
AA3717  
AA3717; North East Units Scale Factor Converg.  
AA3717;UTM 02 - 8,425,084.445 660,791.625 MT 0.99991979 +0 22 00.2  
AA3717  
AA3717! - Elev Factor x Scale Factor = Combined Factor  
AA3717!UTM 02 - 0.99999473 x 0.99991979 = 0.99991452  
AA3717  
AA3717: Primary Azimuth Mark Grid Az  
AA3717:UTM 02 - TAU ET 315 38 11.4  
AA3717  
AA3717|-----|  
AA3717| PID Reference Object Distance Geod. Az |  
AA3717| dddmmss.s |  
AA3717| AA3715 TAU ET APPROX. 0.6 KM 3160011.6 |  
AA3717| AJ2301 TIDE GAGE ET RM 1 72.527 METERS 34349 |  
AA3717| AJ2300 TIDE GAGE ET RM 2 64.907 METERS 34956 |



AA3717|-----|  
AA3717  
AA3717 SUPERSEDED SURVEY CONTROL  
AA3717  
AA3717 NAD 83(2002)- 14 14 28.28422(S) 169 30 34.71404(W) AD(2002.00) A  
AA3717 ELLIP H (02/05/03) 33.529 (m) GP(2002.00) 3 1  
AA3717 NAD 83(1993)- 14 14 28.27541(S) 169 30 34.71218(W) AD(1993.62) 1  
AA3717 ELLIP H (11/30/94) 33.920 (m) GP(1993.62) 5 1  
AA3717 ASD 62 - 14 14 46.59449(S) 169 30 30.28375(W) AD( ) 3  
AA3717  
AA3717.Superseded values are not recommended for survey control.  
AA3717  
AA3717.NGS no longer adjusts projects to the AS datum.  
AA3717.[See file dsdata.txt](#) to determine how the superseded data were derived.  
AA3717  
AA3717\_U.S. NATIONAL GRID SPATIAL ADDRESS: 2LPK6079125084(NAD 83)  
AA3717  
AA3717\_MARKER: DD = SURVEY DISK  
AA3717\_SETTING: 66 = SET IN ROCK OUTCROP  
AA3717\_SP\_SET: BEDROCK  
AA3717\_STAMPING: TIDE GAGE ET 1962 RN GARDNER  
AA3717\_MARK LOGO: USGS  
AA3717\_MAGNETIC: N = NO MAGNETIC MATERIAL  
AA3717\_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD  
AA3717+STABILITY: POSITION/ELEVATION WELL  
AA3717\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
AA3717+SATELLITE: SATELLITE OBSERVATIONS - July 16, 1993  
AA3717  
AA3717 HISTORY - Date Condition Report By  
AA3717 HISTORY - 1962 MONUMENTED USGS  
AA3717 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3717 HISTORY - 1962 SEE DESCRIPTION USGS  
AA3717 HISTORY - 19930716 GOOD NOS  
AA3717  
AA3717 STATION DESCRIPTION  
AA3717  
AA3717'DESCRIBED BY US GEOLOGICAL SURVEY 1962 (BES)  
AA3717'TAU VILLAGE CHURCH, ABOUT 3600 FT AIRLINE, S OF, ON MATAVAI POINT, ON  
AA3717'THE FIRST POINT N OF THE SOUTHERNMOST PROJECTING BLACK ROCK, ABOUT 6  
AA3717'FT FROM THE OCEAN END OF POINT, IN ROCK, STANDARD TABLET STAMPED--TIDE  
AA3717'GAGE ET 1962 R N GARDNER--.  
AA3717  
AA3717 STATION RECOVERY (1962)  
AA3717  
AA3717'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3717'LOCATED 3600 FT S OF CHURCH IN TAU ON MATAVAI POINT.  
AA3717'  
AA3717'TO REACH TAKE TRAIL ALONG W COAST OF TAU TO THE FIRST POINT N OF  
AA3717'SOURTHERNMOST PROJECTING BLACK ROCK ABOUT 6 FT FROM OCEAN.  
AA3717'  
AA3717'STATION MARK IS A STANDARD TABLET STAMPED TIDE GAGE ET 1962 RN GARDNER  
AA3717'SET IN SOLID ROCK.  
AA3717'  
AA3717'REFERENCE MARK 1 IS A STANDARD TABLET STAMPED TIDE GAGE NO 1 1962 SET  
AA3717'ON ROCK POINT 237.95 FT FROM STATION MARK.  
AA3717'  
AA3717'REFERENCE MARK 2 IS A STANDARD REFERENCE MARK TABLET STAMPED TIDE GAGE  
AA3717'NO 2 1962 SET IN ROCK, 212.95 FT FROM STATION MARK.  
AA3717  
AA3717 STATION RECOVERY (1962)  
AA3717  
AA3717'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1962 (RNG)  
AA3717'LOCATED 3600 FT S OF CHURCH IN TAU ON MATAVAI POINT.  
AA3717'  
AA3717'TO REACH TAKE TRAIL ALONG W COAST OF TAU TO THE FIRST POINT N OF

AA3717'SOURTHERNMOST PROJECTING BLACK ROCK ABOUT 6 FT FROM OCEAN.  
AA3717'  
AA3717'STATION MARK IS A STANDARD TABLET STAMPED TIDE GAGE ET 1962 RN GARDNER  
AA3717'SET IN SOLID ROCK.  
AA3717'  
AA3717'REFERENCE MARK 1 IS A STANDARD TABLET STAMPED TIDE GAGE NO 1 1962 SET  
AA3717'ON ROCK POINT 237.95 FT FROM STATION MARK.  
AA3717'  
AA3717'REFERENCE MARK 2 IS A STANDARD REFERENCE MARK TABLET STAMPED TIDE GAGE  
AA3717'NO 2 1962 SET IN ROCK, 212.95 FT FROM STATION MARK.  
AA3717  
AA3717 STATION RECOVERY (1993)  
AA3717  
AA3717'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1993 (JGF)  
AA3717'RECOVERED AS DESCRIBED WITH THE FOLLOWING CHANGE OF THE TO REACH.  
AA3717'FOLLOW MAIN ROAD FROM THE CHURCH MENTIONED IN THE ORIGINAL DESCRIPTION  
AA3717'FOR 3600 FT (1097.3 M) TURN RIGHT INTO THE WHARF ENTRANCE AND HEAD OUT  
AA3717'TO THE SEA WALL. PACK 100 FT (30.5 M) ESE ALONG SEAWALL TO STATION.  
\*\*\* retrieval complete.  
Elapsed Time = 00:00:05

# IV.

## Final GCP's Coordinates Summary

### OFU AIRPORT

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Descriptions
OFU GCP-1	14°11'04.14057"S	169°39'59.55836"W	8431460.205138	643896.842991	3.7	5/8" REBAR / PANEL
OFU GCP-3	14°11'03.77275"S	169°40'03.64710"W	8431472.206541	643774.324754	2.926	5/8" REBAR / PANEL
OFU GCP-4	14°11'03.98107"S	169°40'09.75838"W	8431466.848808	643591.068889	2.076	PAINT STRIPE
OFU GCP-5	14°11'02.05007"S	169°40'18.76307"W	8431527.720842	643321.440979	2.469	5/8" REBAR / PANEL
OFU GCP-7	14°11'03.26111"S	169°40'08.04243"W	8431488.679260	643642.639858	2.048	5/8" REBAR / PANEL
OFU GCP-8	14°11'03.20554"S	169°40'15.79883"W	8431491.709797	643410.108538	2.094	PAINT STRIPE
OFU GCP-9	14°11'06.03432"S	169°40'03.24724"W	8431402.643230	643785.916737	3.298	5/8" REBAR / PANEL
OFU GCP-10	14°11'03.71447"S	169°40'02.12831"W	8431473.738135	643819.869243	3.322	5/8" REBAR / PANEL
OFU GCP-11	14°11'00.50710"S	169°40'16.67121"W	8431574.778072	643384.425612	0.643	5/8" REBAR / PANEL
OFU GCP-12	14°11'03.95043"S	169°40'20.53841"W	8431469.627914	643267.883677	3.063	5/8" REBAR / PANEL
OFU GCP-13	14°11'04.23525"S	169°40'14.41209"W	8431459.831882	643451.503925	1.887	5/8" REBAR / PANEL



OFU AIRPORT GCPS



# FITIUTA AIRPORT

Name	Latitude	Longitude	Grid Northing (m)	Grid Easting (m)	Elevation (m)	Descriptions
TAU GCP-1	14°12'49.52979"S	169°25'55.24152"W	8428064.335141	669189.306839	12.225	BRASS TAB / PAINTED TARGET
TAU GCP-2	14°12'52.78226"S	169°25'30.35903"W	8427959.356442	669934.596454	32.369	PAINT STRIPE
TAU GCP-3	14°12'58.26316"S	169°25'33.39143"W	8427791.532971	669842.550283	41.19	BRASS TAB / PAINTED TARGET
TAU GCP-4	14°12'49.26471"S	169°25'35.19570"W	8428068.435143	669790.325106	31.519	NOS SURVEY DISK / PANEL
TAU GCP-5	14°12'59.58374"S	169°25'20.86671"W	8427748.412450	670217.757030	32.055	5/8" REBAR / PANEL
TAU GCP-6	14°13'03.23156"S	169°25'19.20685"W	8427635.972267	670266.759905	32.671	PAINT STRIPE
TAU GCP-7	14°13'10.23565"S	169°25'21.24042"W	8427421.136917	670204.339564	29.19	PK NAIL / PAINTED TARGET
TAU GCP-8	14°13'20.33156"S	169°25'19.92178"W	8427110.604721	670241.771137	24.408	BRASS TAB / PAINTED TARGET
TAU GCP-9	14°13'05.40577"S	169°25'17.97247"W	8427568.904484	670303.313326	31.552	NOS SURVEY DISK / PANEL



**FITIUTA AIRPORT GCPs**



# V. GCP's Adjustment Statistics and Report

## Project Summary

Project name: **ADJ PH-2 OFU MANUA (OFU AIRPORT) GCP 9-15-12.ttp**

Surveyor: **FW**

Comment:

Linear unit: **Meters**

Projection: **UTMSouth-Zone\_2 : 174W to 168W**

Geoid:

### Adjustment Summary

Adjustment type: **Plane + Height, Constraint**

Confidence level: **95 %**

Number of adjusted points: **13**

Number of plane control points: **2**

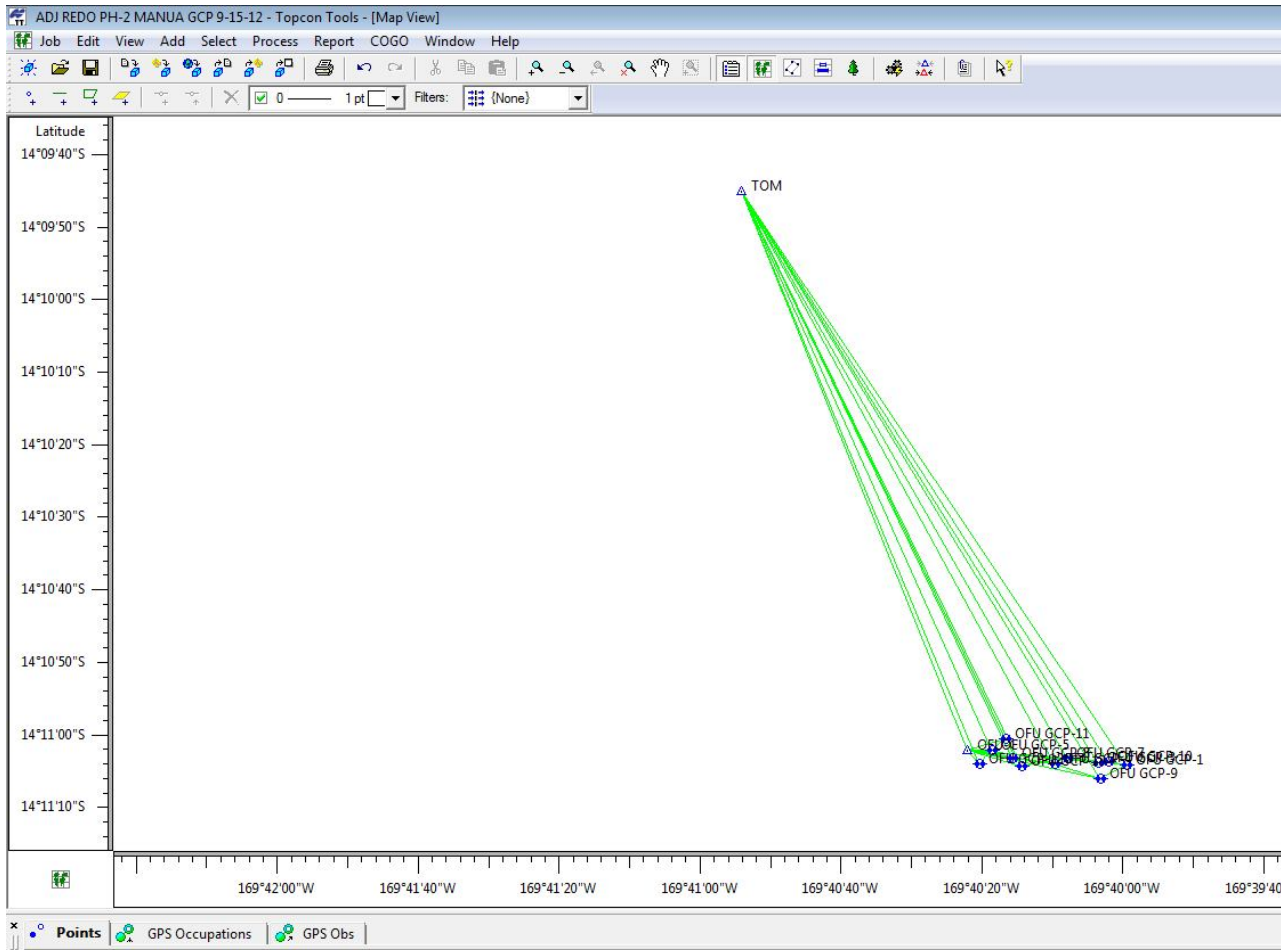
Number of used GPS vectors: **33**

Number of rejected GPS vectors by plane: **12**

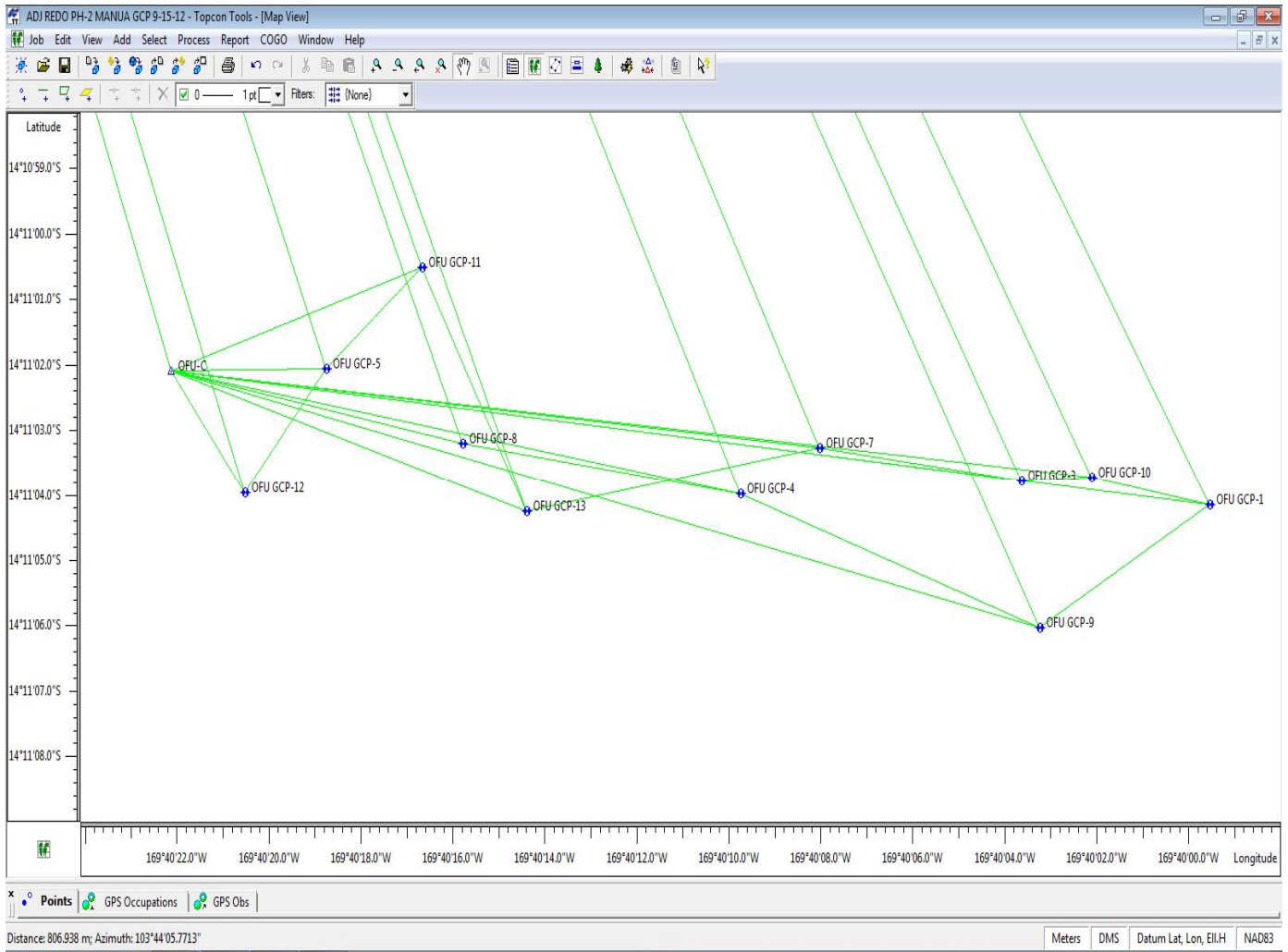
A posteriori plane UWE: **0.8740733** , Bounds: ( **0.6924594** , **1.307096** )

Number of height control points: **2**

A posteriori height UWE: **1.569581** , Bounds: ( **0.7064636** , **1.292988** )



OFU AIRPORT GCP'S MAP VIEW-1



OFU AIRPORT GCP'S MAP VIEW-2

GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
OFU GCP-1-OFU GCP-9	-57.562	-110.926	-0.407	0.001	0.001
OFU GCP-1-OFU GCP-10	13.533	-76.974	-0.385	0.001	0.001
OFU GCP-1-OFU-C	66.950	-676.469	-0.396	0.002	0.004
OFU GCP-1-TOM	2439.867	-1621.633	0.121	0.005	0.008
OFU GCP-3-OFU GCP-7	16.474	-131.687	-0.873	0.001	0.002
OFU GCP-3-OFU GCP-10	1.531	45.545	0.393	0.000	0.001
OFU GCP-3-OFU-C	54.947	-553.948	0.381	0.002	0.004
OFU GCP-3-TOM	2427.859	-1499.115	0.909	0.007	0.017
OFU GCP-4-OFU GCP-8	24.861	-180.959	0.014	0.001	0.001
OFU GCP-4-OFU GCP-9	-64.205	194.847	1.220	0.001	0.002
OFU GCP-4-OFU-C	60.306	-370.694	1.239	0.001	0.003
OFU GCP-4-TOM	2433.218	-1315.856	1.746	0.009	0.019

OFU GCP-5-OFU GCP-11	47.057	62.984	-1.802	0.001	0.001
OFU GCP-5-OFU GCP-12	-58.093	-53.557	0.609	0.000	0.001
OFU GCP-5-OFU-C	-0.566	-101.066	0.855	0.001	0.002
OFU GCP-5-TOM	2372.352	-1046.230	1.428	0.003	0.007
OFU GCP-7-OFU GCP-13	-28.847	-191.137	-0.170	0.001	0.003
OFU GCP-7-OFU-C	38.477	-422.267	1.252	0.002	0.003
OFU GCP-7-TOM	2411.387	-1367.426	1.784	0.006	0.017
OFU GCP-8-OFU-C	35.445	-189.732	1.216	0.002	0.004
OFU GCP-8-TOM	2408.342	-1134.905	1.747	0.010	0.020
OFU GCP-9-OFU-C	124.511	-565.543	0.011	0.002	0.004
OFU GCP-9-TOM	2497.421	-1510.707	0.534	0.005	0.010
OFU GCP-10-OFU-C	53.416	-599.494	-0.019	0.002	0.004
OFU GCP-10-TOM	2426.330	-1544.660	0.514	0.005	0.013
OFU GCP-11-OFU GCP-13	-114.944	67.081	1.253	0.008	0.015
OFU GCP-11-OFU-C	-47.624	-164.052	2.662	0.001	0.002
OFU GCP-11-TOM	2325.293	-1109.215	3.220	0.004	0.008
OFU GCP-12-OFU-C	57.527	-47.508	0.250	0.001	0.002
OFU GCP-12-TOM	2430.451	-992.671	0.834	0.005	0.013
OFU GCP-13-OFU-C	67.323	-231.130	1.422	0.002	0.006
OFU GCP-13-TOM	2440.237	-1176.290	1.958	0.008	0.016
OFU-C-TOM	2372.908	-945.173	0.546	0.002	0.004

Control Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
OFU-C	14°11'02.08718"S	169°40'22.13391"W	3.300	BM
TOM	14°09'45.04076"S	169°40'54.10560"W	3.849	BM

## Loop Closures

Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
OFU GCP-10-OFU-C(9/15/2012 12:19:34 PM) OFU GCP-10-TOM(9/15/2012 12:19:34 PM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0094	0.0127	0.0602	0.0902	1.55	2.11	6033.272
OFU GCP-10-OFU-C(9/15/2012 12:19:34 PM) OFU GCP-3-OFU GCP-10(9/15/2012 12:24:57 PM) OFU GCP-3-OFU-C(9/15/2012 12:24:57 PM)	0.0011	0.0079	0.036	0.066	0.94	6.57	1204.2827
OFU GCP-10-OFU-C(9/15/2012 12:19:34 PM) OFU GCP-1-OFU GCP-10(9/15/2012 12:19:34 PM) OFU GCP-1-OFU-C(9/15/2012 11:51:19 AM)	0.0024	0.0082	0.0368	0.0668	1.77	6.01	1359.9958
OFU GCP-11-OFU-C(9/15/2012 1:34:12 PM) OFU GCP-11-OFU GCP-13(9/15/2012 1:34:12 PM) OFU GCP-13-OFU-C(9/15/2012 1:04:35 PM)	0.0037	0.0122	0.0327	0.0627	6.73	22.46	544.7564
OFU GCP-11-TOM(9/15/2012 1:34:12 PM) OFU GCP-11-OFU GCP-13(9/15/2012 1:34:12 PM) OFU GCP-13-TOM(9/15/2012 1:04:35 PM)	0.0061	0.0098	0.0571	0.0871	1.13	1.8	5419.1514
OFU GCP-1-OFU GCP-10(9/15/2012 12:19:34 PM) OFU GCP-1-TOM(9/15/2012 11:51:19 AM) OFU GCP-10-TOM(9/15/2012 12:19:34 PM)	0.0042	0.0086	0.0594	0.0894	0.72	1.46	5884.9286
OFU GCP-1-OFU GCP-9(9/15/2012 11:51:19 AM) OFU GCP-1-TOM(9/15/2012 11:51:19 AM) OFU GCP-9-TOM(9/15/2012 11:39:20 AM)	0.0078	0.0058	0.0599	0.0899	1.31	0.97	5974.2605
OFU GCP-1-OFU-C(9/15/2012 11:51:19 AM) OFU GCP-1-TOM(9/15/2012 11:51:19 AM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0124	0.0295	0.0608	0.0908	2.02	4.79	6164.5201
OFU GCP-3-OFU GCP-10(9/15/2012 12:24:57 PM) OFU GCP-3-TOM(9/15/2012 12:24:57 PM) OFU GCP-10-TOM(9/15/2012 12:19:34 PM)	0.002	0.002	0.0589	0.0889	0.34	0.34	5776.1073
OFU GCP-3-OFU GCP-7(9/15/2012 12:58:20 PM) OFU GCP-3-TOM(9/15/2012 12:24:57 PM) OFU GCP-7-TOM(9/15/2012 12:58:20 PM)	0.0023	0.0017	0.0588	0.0888	0.4	0.29	5759.0778
OFU GCP-3-OFU-C(9/15/2012 12:24:57 PM) OFU GCP-3-TOM(9/15/2012 12:24:57 PM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0073	0.0187	0.0598	0.0898	1.22	3.13	5965.1609
OFU GCP-4-OFU GCP-8(9/15/2012 11:17:39 AM) OFU GCP-4-TOM(9/15/2012 11:17:39 AM) OFU GCP-8-TOM(9/15/2012 )	0.017	0.0153	0.0581	0.0881	3.03	2.73	5612.0723



11:04:52 AM)							
OFU GCP-4-OFU GCP-9(9/15/2012 11:39:20 AM) OFU GCP-4-TOM(9/15/2012 11:17:39 AM) OFU GCP-9-TOM(9/15/2012 11:39:20 AM)	0.0046	0.0082	0.0595	0.0895	0.78	1.39	5891.0484
OFU GCP-4-OFU-C(9/15/2012 11:17:39 AM) OFU GCP-4-TOM(9/15/2012 11:17:39 AM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0117	0.0397	0.0585	0.0885	2.05	6.98	5696.8637
OFU GCP-5-OFU-C(9/15/2012 1:38:09 PM) OFU GCP-5-OFU GCP- 12(9/15/2012 2:09:49 PM) OFU GCP-12-OFU-C(9/15/2012 2:09:49 PM)	0.0009	0.004	0.0313	0.0613	3.48	15.71	254.733
OFU GCP-5-OFU-C(9/15/2012 1:38:09 PM) OFU GCP-5-OFU GCP- 11(9/15/2012 1:38:09 PM) OFU GCP-11-OFU-C(9/15/2012 1:34:12 PM)	0.0015	0.005	0.0318	0.0618	4.3	14.23	350.6102
OFU GCP-5-OFU-C(9/15/2012 1:38:09 PM) OFU GCP-5-TOM(9/15/2012 1:38:09 PM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0138	0.027	0.0562	0.0862	2.63	5.15	5248.8788
OFU GCP-5-TOM(9/15/2012 1:38:09 PM) OFU GCP-5-OFU GCP- 12(9/15/2012 2:09:49 PM) OFU GCP-12-TOM(9/15/2012 2:09:49 PM)	0.0071	0.015	0.0565	0.0865	1.34	2.84	5297.9644
OFU GCP-5-TOM(9/15/2012 1:38:09 PM) OFU GCP-5-OFU GCP- 11(9/15/2012 1:38:09 PM) OFU GCP-11-TOM(9/15/2012 1:34:12 PM)	0.0023	0.0105	0.0562	0.0862	0.43	2	5248.534
OFU GCP-7-OFU-C(9/15/2012 12:58:20 PM) OFU GCP-7-OFU GCP- 13(9/15/2012 1:04:35 PM) OFU GCP-13-OFU-C(9/15/2012 1:04:35 PM)	0.0019	0.0001	0.0343	0.0643	2.18	0.13	858.1846
OFU GCP-7-OFU-C(9/15/2012 12:58:20 PM) OFU GCP-7-TOM(9/15/2012 12:58:20 PM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0142	0.014	0.0588	0.0888	2.47	2.43	5751.2098
OFU GCP-7-OFU-C(9/15/2012 12:58:20 PM) OFU GCP-3-OFU GCP-7(9/15/2012 12:58:20 PM) OFU GCP-3-OFU-C(9/15/2012 12:24:57 PM)	0.0076	0.003	0.0356	0.0656	6.81	2.71	1113.5634
OFU GCP-7-TOM(9/15/2012 12:58:20 PM) OFU GCP-7-OFU GCP- 13(9/15/2012 1:04:35 PM) OFU GCP-13-TOM(9/15/2012 1:04:35 PM)	0.0018	0.0034	0.0584	0.0884	0.32	0.6	5675.2107
OFU GCP-8-OFU-C(9/15/2012 11:04:52 AM) OFU GCP-8-TOM(9/15/2012 11:04:52 AM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.0104	0.0152	0.0571	0.0871	1.91	2.81	5410.3946
OFU GCP-8-OFU-C(9/15/2012 11:04:52 AM)	0.0022	0.0092	0.0338	0.0638	2.94	12.28	751.3571

OFU GCP-4-OFU GCP-8(9/15/2012 11:17:39 AM) OFU GCP-4-OFU-C(9/15/2012 11:17:39 AM)							
OFU GCP-9-OFU-C(9/15/2012 11:39:20 AM) OFU GCP-9-TOM(9/15/2012 11:39:20 AM) OFU-C-TOM(9/15/2012 7:31:50 AM)	0.009	0.0236	0.0603	0.0903	1.49	3.91	6052.9951
OFU GCP-9-OFU-C(9/15/2012 11:39:20 AM) OFU GCP-1-OFU GCP-9(9/15/2012 11:51:19 AM) OFU GCP-1-OFU-C(9/15/2012 11:51:19 AM)	0.0015	0.0001	0.0369	0.0669	1.09	0.04	1384.0351
OFU GCP-9-OFU-C(9/15/2012 11:39:20 AM) OFU GCP-4-OFU GCP-9(9/15/2012 11:39:20 AM) OFU GCP-4-OFU-C(9/15/2012 11:17:39 AM)	0.002	0.0079	0.0358	0.0658	1.76	6.81	1159.982
OFU-C-TOM(9/15/2012 7:31:50 AM) OFU GCP-13-OFU-C(9/15/2012 1:04:35 PM) OFU GCP-13-TOM(9/15/2012 1:04:35 PM)	0.0146	0.0105	0.0575	0.0875	2.65	1.9	5504.7273
OFU-C-TOM(9/15/2012 7:31:50 AM) OFU GCP-12-OFU-C(9/15/2012 2:09:49 PM) OFU GCP-12-TOM(9/15/2012 2:09:49 PM)	0.0199	0.0381	0.0563	0.0863	3.78	7.25	5254.9646
OFU-C-TOM(9/15/2012 7:31:50 AM) OFU GCP-11-OFU-C(9/15/2012 1:34:12 PM) OFU GCP-11-TOM(9/15/2012 1:34:12 PM)	0.0128	0.0115	0.0565	0.0865	2.41	2.18	5302.1583

Adjusted Points				
Name	Latitude	Longitude	Elevation (Datum) (m)	Code
OFU GCP-1	14°11'04.14057"S	169°39'59.55836"W	3.700	GCP
OFU GCP-3	14°11'03.77275"S	169°40'03.64710"W	2.923	GCP
OFU GCP-4	14°11'03.98107"S	169°40'09.75838"W	2.069	GCP
OFU GCP-5	14°11'02.05007"S	169°40'18.76307"W	2.440	GCP
OFU GCP-7	14°11'03.26111"S	169°40'08.04243"W	2.050	GCP
OFU GCP-8	14°11'03.20554"S	169°40'15.79883"W	2.084	GCP
OFU GCP-9	14°11'06.03432"S	169°40'03.24724"W	3.292	GCP
OFU GCP-10	14°11'03.71447"S	169°40'02.12831"W	3.316	GCP
OFU GCP-11	14°11'00.50710"S	169°40'16.67121"W	0.637	GCP
OFU GCP-12	14°11'03.95043"S	169°40'20.53841"W	3.049	GCP
OFU GCP-13	14°11'04.23525"S	169°40'14.41209"W	1.880	GCP

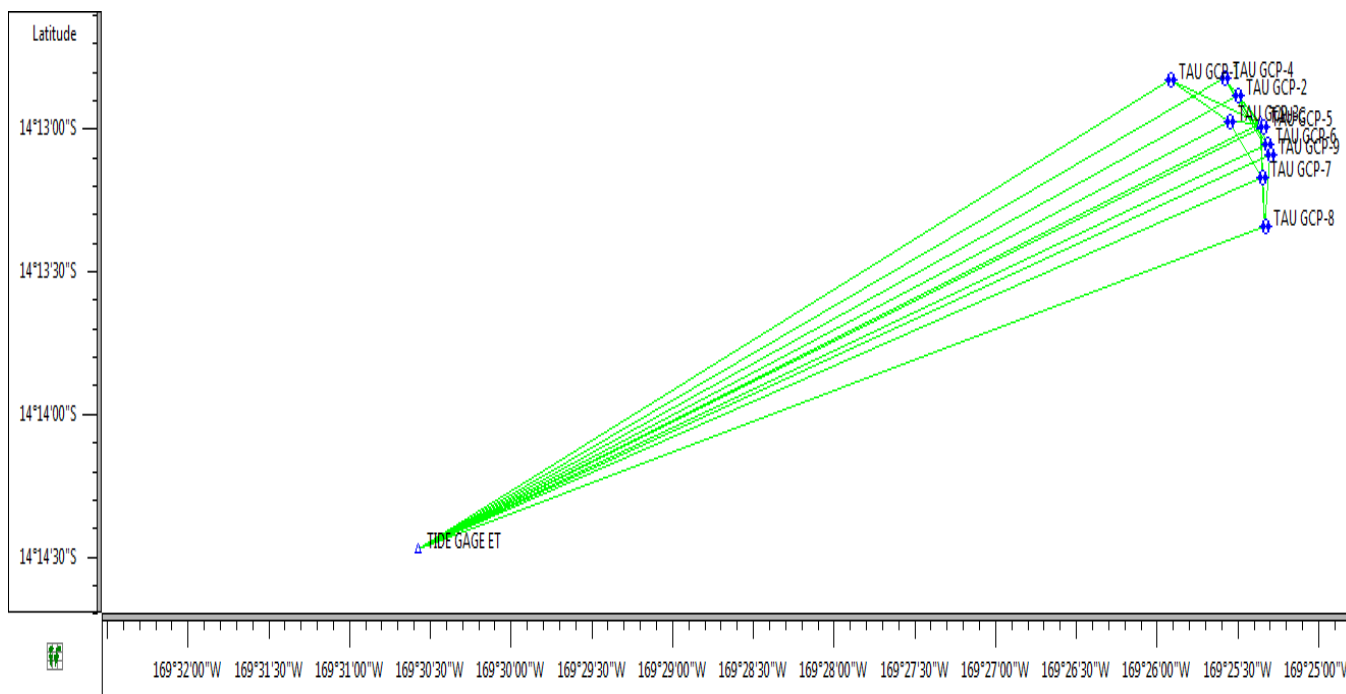
NOTE: SHOWN ELEVATIONS ARE NOT FINALS

## Project Summary

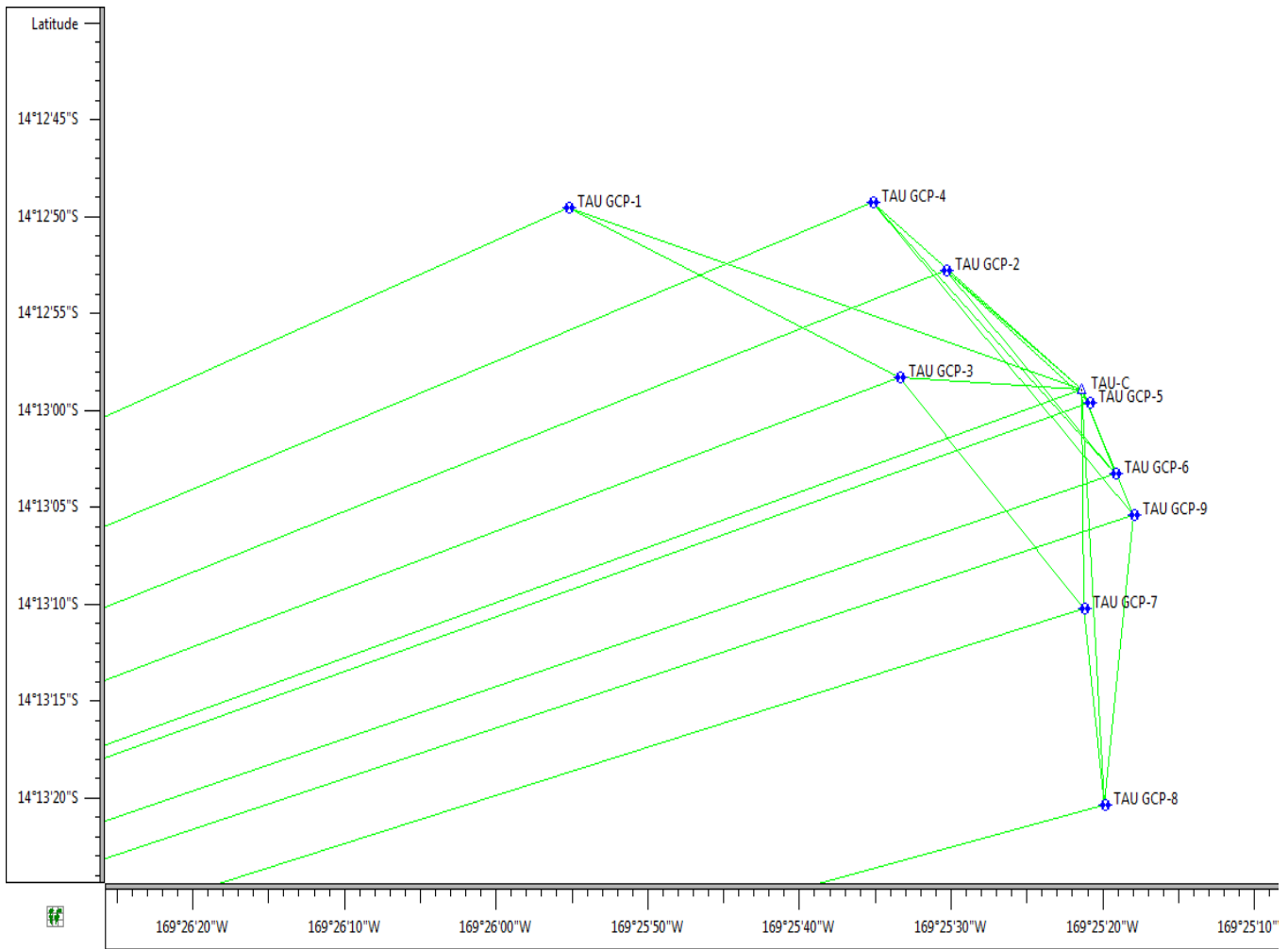
Project name: **ADJ PH-2 TAU MANUA (FITIUTA AIRPORT) GCP 9-13-12.ttp**

Surveyor: **FW**  
Comment:  
Linear unit: **Meters**  
Projection: **UTMSouth-Zone\_2 : 174W to 168W**  
Geoid:  
**Adjustment Summary**

Adjustment type: **Plane + Height, Constraint**  
Confidence level: **95 %**  
Number of adjusted points: **11**  
Number of plane control points: **2**  
Number of used GPS vectors: **27**  
Number of rejected GPS vectors by plane: **8**  
A posteriori plane UWE: **0.9277444** , Bounds: ( **0.6924594** , **1.307096** )  
Number of height control points: **1**  
Number of rejected GPS vectors by height: **2**  
A posteriori height UWE: **1.476393** , Bounds: ( **0.6460134** , **1.35376** )



FITIUTA AIRPORT GCP'S MAP VIEW-1



FITIUTA AIRPORT GCP'S MAP VIEW-2

GPS Observation Residuals					
Name	dN (m)	dE (m)	dHt (m)	Horz RMS (m)	Vert RMS (m)
TAU GCP-1-TAU GCP-3	-272.802	653.243	28.87628	0.001	0.00248
TAU GCP-1-TAU-C	-294.842	1012.926	20.10296	0.002	0.00416
TAU GCP-1-TIDE GAGE ET	-2979.900	-8397.655	-8.89315	0.014	0.02890
TAU GCP-2-TAU GCP-5	-210.945	283.161	-0.36360	0.001	0.00135
TAU GCP-2-TAU GCP-6	-323.384	332.165	0.23741	0.001	0.00139
TAU GCP-2-TAU-C	-189.863	267.632	0.05838	0.001	0.00252
TAU GCP-2-TIDE GAGE ET	-2874.921	-9142.975	-28.86805	0.011	0.02350
TAU GCP-3-TAU GCP-7	-370.395	361.787	-12.04252	0.001	0.00305
TAU GCP-3-TAU-C	-22.041	359.682	-8.79344	0.002	0.00441
TAU GCP-3-TIDE GAGE ET	-2707.097	-9050.897	-37.75525	0.009	0.01939
TAU GCP-4-TAU GCP-6	-432.463	476.435	1.08100	0.001	0.00236



TAU GCP-4-TAU GCP-9	-499.531	512.989	-0.01960	0.002	0.00301
TAU GCP-4-TAU-C	-298.942	411.905	0.89924	0.001	0.00337
TAU GCP-4-TIDE GAGE ET	-2984.023	-8998.665	-28.03414	0.010	0.02144
TAU GCP-5-TAU-C	21.080	-15.526	0.40899	0.001	0.00185
TAU GCP-5-TIDE GAGE ET	-2663.959	-9426.133	-28.48652	0.015	0.02577
TAU GCP-6-TAU-C	133.521	-64.529	-0.19243	0.001	0.00270
TAU GCP-6-TIDE GAGE ET	-2551.552	-9475.109	-29.13517	0.014	0.03936
TAU GCP-7-TAU GCP-8	-310.532	37.432	-4.78328	0.003	0.00550
TAU GCP-7-TAU-C	348.357	-2.112	3.24787	0.002	0.00359
TAU GCP-7-TIDE GAGE ET	-2336.697	-9412.670	-25.62395	0.019	0.03731
TAU GCP-8-TAU GCP-9	458.301	61.543	7.12418	0.001	0.00247
TAU GCP-8-TAU-C	658.889	-39.542	8.03287	0.003	0.00562
TAU GCP-8-TIDE GAGE ET	-2026.157	-9450.113	-20.84836	0.017	0.03043
TAU GCP-9-TAU-C	200.589	-101.083	0.91443	0.001	0.00180
TAU GCP-9-TIDE GAGE ET	-2484.470	-9511.659	-27.96982	0.018	0.02882
TAU-C-TIDE GAGE ET	-2685.052	-9410.583	-28.94210	0.006	0.01294

Loop Closures							
Loop	dHz (m)	dU (m)	Horz Tolerance (m)	Vert Tolerance (m)	dHz (ppm)	dU (ppm)	Length (m)
TAU GCP-1-TAU-C(9/13/2012 6:06:20 PM) TAU GCP-1-TAU GCP-3(9/13/2012 6:06:20 PM) TAU GCP-3-TAU-C(9/13/2012 5:32:47 PM)	0.0019	0.0201	0.0406	0.0706	0.88	9.47	2124.2285
TAU GCP-1-TIDE GAGE ET(9/13/2012 6:06:20 PM) TAU GCP-1-TAU GCP-3(9/13/2012 6:06:20 PM) TAU GCP-3-TIDE GAGE ET(9/13/2012 5:32:47 PM)	0.0019	0.0142	0.1253	0.1553	0.1	0.74	19067.5713
TAU GCP-5-TAU-C(9/13/2012 3:31:23 PM) TAU GCP-2-TAU GCP-5(9/13/2012 3:41:48 PM) TAU GCP-2-TAU-C(9/13/2012 3:41:48 PM)	0.0039	0.013	0.0335	0.0635	5.56	18.35	707.4532
TAU GCP-5-TIDE GAGE ET(9/13/2012 3:31:23 PM) TAU GCP-2-TAU GCP-5(9/13/2012 3:41:48 PM) TAU GCP-2-TIDE GAGE ET(9/13/2012 3:41:48 PM)	0.0185	0.0179	0.1287	0.1587	0.94	0.91	19734.099

TAU GCP-6-TAU-C(9/13/2012 4:05:49 PM) TAU GCP-4-TAU GCP-6(9/13/2012 4:17:41 PM) TAU GCP-4-TAU-C(9/13/2012 4:17:41 PM)	0.0012	0.0107	0.0365	0.0665	0.92	8.21	1300.7519
TAU GCP-6-TAU-C(9/13/2012 4:05:49 PM) TAU GCP-2-TAU GCP-6(9/13/2012 4:05:49 PM) TAU GCP-2-TAU-C(9/13/2012 3:41:48 PM)	0.0043	0.0134	0.0347	0.0647	4.54	14.26	940.0634
TAU GCP-6-TIDE GAGE ET(9/13/2012 4:05:49 PM) TAU GCP-4-TAU GCP-6(9/13/2012 4:17:41 PM) TAU GCP-4-TIDE GAGE ET(9/13/2012 4:17:41 PM)	0.0116	0.02	0.1297	0.1597	0.58	1.01	19937.9698
TAU GCP-6-TIDE GAGE ET(9/13/2012 4:05:49 PM) TAU GCP-2-TAU GCP-6(9/13/2012 4:05:49 PM) TAU GCP-2-TIDE GAGE ET(9/13/2012 3:41:48 PM)	0.0343	0.0297	0.1293	0.1593	1.73	1.5	19861.9046
TAU GCP-7-TAU-C(9/13/2012 5:21:04 PM) TAU GCP-3-TAU GCP-7(9/13/2012 5:32:47 PM) TAU GCP-3-TAU-C(9/13/2012 5:32:47 PM)	0.0072	0.0012	0.0361	0.0661	5.89	0.99	1226.8078
TAU GCP-7-TAU-C(9/13/2012 5:21:04 PM) TAU GCP-7-TAU GCP-8(9/13/2012 5:21:04 PM) TAU GCP-8-TAU-C(9/13/2012 4:53:19 PM)	0.0024	0.0017	0.0366	0.0666	1.78	1.31	1321.3785
TAU GCP-7-TIDE GAGE ET(9/13/2012 5:21:04 PM) TAU GCP-3-TAU GCP-7(9/13/2012 5:32:47 PM) TAU GCP-3-TIDE GAGE ET(9/13/2012 5:32:47 PM)	0.0149	0.0888	0.1283	0.1583	0.76	4.51	19664.72
TAU GCP-7-TIDE GAGE ET(9/13/2012 5:21:04 PM) TAU GCP-7-TAU GCP-8(9/13/2012 5:21:04 PM) TAU GCP-8-TIDE GAGE ET(9/13/2012 4:53:19 PM)	0.0141	0.0077	0.1284	0.1584	0.72	0.39	19677.3725
TAU GCP-9-TAU-C(9/13/2012 4:37:31 PM) TAU GCP-4-TAU GCP-9(9/13/2012 4:37:31 PM) TAU GCP-4-TAU-C(9/13/2012 4:17:41 PM)	0.0009	0.0044	0.0372	0.0672	0.64	3.04	1449.6653
TAU GCP-9-TAU-C(9/13/2012 4:37:31 PM) TAU GCP-8-TAU GCP-9(9/13/2012 4:53:19 PM) TAU GCP-8-TAU-C(9/13/2012 4:53:19 PM)	0.002	0.0057	0.0367	0.0667	1.51	4.27	1347.2749
TAU GCP-9-TIDE GAGE ET(9/13/2012 4:37:31 PM) TAU GCP-4-TAU GCP-9(9/13/2012 4:37:31 PM) TAU GCP-4-TIDE GAGE ET(9/13/2012 4:17:41 PM)	0.0225	0.0447	0.1301	0.1601	1.12	2.23	20028.6821
TAU GCP-9-TIDE GAGE	0.0129	0.0027	0.1298	0.1598	0.64	0.14	19959.4507

ET(9/13/2012 4:37:31 PM) TAU GCP-8-TAU GCP-9(9/13/2012 4:53:19 PM) TAU GCP-8-TIDE GAGE ET(9/13/2012 4:53:19 PM)							
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-3-TAU-C(9/13/2012 5:32:47 PM) TAU GCP-3-TIDE GAGE ET(9/13/2012 5:32:47 PM)	0.0061	0.0197	0.128	0.158	0.31	1.01	19595.0511
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-4-TAU-C(9/13/2012 4:17:41 PM) TAU GCP-4-TIDE GAGE ET(9/13/2012 4:17:41 PM)	0.0315	0.0087	0.1289	0.1589	1.59	0.44	19776.9664
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-8-TAU-C(9/13/2012 4:53:19 PM) TAU GCP-8-TIDE GAGE ET(9/13/2012 4:53:19 PM)	0.0128	0.0609	0.1306	0.1606	0.64	3.03	20112.4775
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-2-TAU-C(9/13/2012 3:41:48 PM) TAU GCP-2-TIDE GAGE ET(9/13/2012 3:41:48 PM)	0.0251	0.0157	0.1285	0.1585	1.28	0.8	19699.9425
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-1-TAU-C(9/13/2012 6:06:20 PM) TAU GCP-1-TIDE GAGE ET(9/13/2012 6:06:20 PM)	0.0062	0.054	0.1288	0.1588	0.31	2.73	19753.2851
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-7-TAU-C(9/13/2012 5:21:04 PM) TAU GCP-7-TIDE GAGE ET(9/13/2012 5:21:04 PM)	0.0251	0.0703	0.1292	0.1592	1.26	3.54	19834.2312
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-9-TAU-C(9/13/2012 4:37:31 PM) TAU GCP-9-TIDE GAGE ET(9/13/2012 4:37:31 PM)	0.0096	0.0579	0.1292	0.1592	0.49	2.92	19842.8861
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-6-TAU-C(9/13/2012 4:05:49 PM) TAU GCP-6-TIDE GAGE ET(9/13/2012 4:05:49 PM)	0.0207	0.0006	0.1287	0.1587	1.05	0.03	19748.4308
TAU-C-TIDE GAGE ET(9/13/2012 3:27:20 PM) TAU GCP-5-TAU-C(9/13/2012 3:31:23 PM) TAU GCP-5-TIDE GAGE ET(9/13/2012 3:31:23 PM)	0.0276	0.0466	0.128	0.158	1.41	2.38	19608.9992

Control Points				
Name	Latitude	Longitude	Ell.Height (m)	Code
TAU-C	14°12'58.90124"S	169°25'21.38936"W	32.46126	BM
TIDE GAGE ET	14°14'28.28498"S	169°30'34.71342"W	3.53069	BM

Adjusted Points				
Name	Latitude	Longitude	Ell.Height (m)	Code
TAU GCP-1	14°12'49.52979"S	169°25'55.24155"W	12.36853	GCP
TAU GCP-2	14°12'52.78226"S	169°25'30.35903"W	32.40980	GCP
TAU GCP-3	14°12'58.26316"S	169°25'33.39144"W	41.24967	GCP
TAU GCP-4	14°12'49.26470"S	169°25'35.19571"W	31.56585	GCP
TAU GCP-5	14°12'59.58374"S	169°25'20.86671"W	32.04871	GCP
TAU GCP-6	14°13'03.23156"S	169°25'19.20685"W	32.64872	GCP
TAU GCP-7	14°13'10.23566"S	169°25'21.24042"W	29.20946	GCP
TAU GCP-8	14°13'20.33158"S	169°25'19.92178"W	24.42412	GCP
TAU GCP-9	14°13'05.40578"S	169°25'17.97247"W	31.54697	GCP

NOTE: SHOWN ELEVATIONS ARE NOT FINALS



VI.

Data Log Sheets with Photographs

POB MAPPING SERVICES

GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: Tau GCP-1

ANTENNA HEIGHT: 2M

START TIME: 6:06PM

STOP TIME: 6:38PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: BRASS TAB, SET IN THE MIDDLE OF CONCRETE ROAD

LOCATION: MARK IS LOCATED ON THE NORTHWESTERLY END OF THE VILLAGE OF FITIUTA ON THE MAIN CONCRETE ROAD TO FAGA.



SKETCH AREA (NTS)



TAU GCP-1

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Tau GCP-2

ANTENNA HEIGHT: 2M

START TIME: 3:41PM

STOP TIME: 4:14PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PAINT STRIPE CENTERLINE OF RUNWAY.

LOCATION: MARK IS LOCATED ON THE SOUTHWEST CORNER OF AN EXISTING PAINT STRIPE ON THE CENTER LINE OF FITIUTA AIRPORT RUNWAY AND IT'S EAST OF THE FIRE CRASH BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAU GCP-2



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Tau GCP-3

ANTENNA HEIGHT: 2M

START TIME: 5:32PM

STOP TIME: 6:41PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: BRASS TAB, SET IN THE MIDDLE OF CONCRETE ROAD. PAINTED TARGET.

LOCATION: MARK IS LOCATED ON THE ROAD INTERSECTION TURN OFF TO FITIUTA AIRPORT.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAU GCP-3

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Tau GCP-4

ANTENNA HEIGHT: 2M

START TIME: 4:17PM

STOP TIME: 4:47PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NOS SURVEY DISK, SET IN CORNER CONCRETE SLAB. PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED NORTH, NORTHWEST PORTION OF THE FITIUTA AIRPORT RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAU GCP-4



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: Tau GCP-5

ANTENNA HEIGHT: 2M

START TIME: 3:31PM

STOP TIME: 4:02PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REBAR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS PLACE ON THE MARK.

LOCATION: MARK IS LOCATED SOUTHEAST OF TAU-C BENCH MARK

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**SEE ATTACHED PHOTOS FOR DETAILS**

SKETCH AREA (NTS)



TAU GCP-5

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Tau GCP-6

ANTENNA HEIGHT: 2M

START TIME: 4:05PM

STOP TIME: 4:35PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PAINT STRIPE CENTER LINE OF RUNWAY

LOCATION: MARK IS LOCATED ON THE NORTHWEST CORNER OF AN EXISTING PAINT STRIPE ON THE CENTER LINE OF FITIUTA RUNWAY AND IT'S SOUTHEAST OF TAU "C" BENCH MARK.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAU GCP-6



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Tau GCP-7

ANTENNA HEIGHT: 2M

START TIME: 5:21PM

STOP TIME: 6:00PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: BRASS TAB, SET IN CONCRETE ROAD  
PAINTED TARGET.

LOCATION: MARK IS LOCATED NORTHWEST OF THE FITIUTA AOG  
CHURCH BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAU GCP-7

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: Tau GCP-8

ANTENNA HEIGHT: 2M

START TIME: 4:53PM

STOP TIME: 5:28PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: BRASS TAB, SET IN THE MIDDLE OF CONCRETE ROAD, PAINTED TARGET.

LOCATION: MARK IS LOCATED ON THE SOUTH END OF THE VILLAGE OF FITIUTA ON THE MAIN CONCRETE ROAD.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAU GCP-8



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Tau GCP-9

ANTENNA HEIGHT: 2M

START TIME: 4:37PM

STOP TIME: 5:15PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NOS SURVEY DISK, SET IN CORNER OF CONCRETE SLAB. PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED ON THE SOUTH CORNER OF A CONCRETE SLAB , WEST AND SOUTHWEST OF THE RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



TAU GCP-9

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Toma,

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN : P87ZRUPHQ80

**Tau Base-1**  
PT#: **(Tau "C")**

ANTENNA HEIGHT: 2M

START TIME: 3:27PM

STOP TIME: 6:46PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: NOS SURVEY DISK.

LOCATION: MARK IS LOCATED IN THE WINDSOCK SITE OF THE RUNWAY  
AND IT'S SET IN ONE OF THE 3X8 FT CONCRETE PADS.

**SEE ATTACHED PHOTOS FOR DETAILS**

SKETCH AREA (NTS)



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/12/12

PROJECT: Fitiuta Airport GCP'S

OPERATOR: Galen, Wei

COUNTY: Manu'a tele

VILLAGE: Fitiuta

ANTENNA TYPE: GR3

RECEIVER SN: P8ELL1T7T34

PT#: **Tau Base-2**  
**(TIDE GAGE ET)**

ANTENNA HEIGHT: 1.8M

START TIME: 2:46PM

STOP TIME: 7:18PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: USGS SURVEY DISK SET IN SOLID ROCK.

LOCATION: MARK IS LOCATED SOUTHEAST OF THE TAU WHARF  
AND THE M & O COMPOUND.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





TAU BASE-1 (TAU C)



TAU BASE-2 (TIDE GAGE ET)

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Ofu GCP-1

ANTENNA HEIGHT: 2M

START TIME: 11:51AM

STOP TIME: 12:21PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED EAST OF THE OFU RUNWAY AND SOUTH  
OF VAOTO LODGE.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GC-1

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Ofu GCP-3

ANTENNA HEIGHT: 2M

START TIME: 12:24PM

STOP TIME: 1:01PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH GROUND

PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED BETWEEN THE OFU AIPORT BUILDING  
AND OFU RUNWAY.



SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-3

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWAO

PT#: Ofu GCP-4

ANTENNA HEIGHT: 2M

START TIME: 11:17AM

STOP TIME: 11:48PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: PAINT STRIPE CENTER LINE OF RUNWAY

LOCATION: MARK IS LOCATED ON THE SOUTHEAST CORNER OF A  
EXISTING PAINT STRIPE ON THE CENTER LINE OF OFU RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-4

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: Q817R5XEWAO

PT#: Ofu GCP-5

ANTENNA HEIGHT: 2M

START TIME: 1:38PM

STOP TIME: 2:36PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED SOUTHEAST OF OFU DISPENSARY AND  
WEST OF A DIRT ROAD TO ASTCA DCO BUILDING.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-5

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: Ofu GCP-7

ANTENNA HEIGHT: 2M

START TIME: 12:58PM

STOP TIME: 1:30PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED EAST, SOUTHEAST OF THE SWAMP AREA  
AND NORTHEAST OF OFU GCP-4.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-7

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Ofu GCP-8

ANTENNA HEIGHT: 2M

START TIME: 11:04AM

STOP TIME: 11:36AM

LATITUDE: NA +/-

LONGITUDE: NA +/-

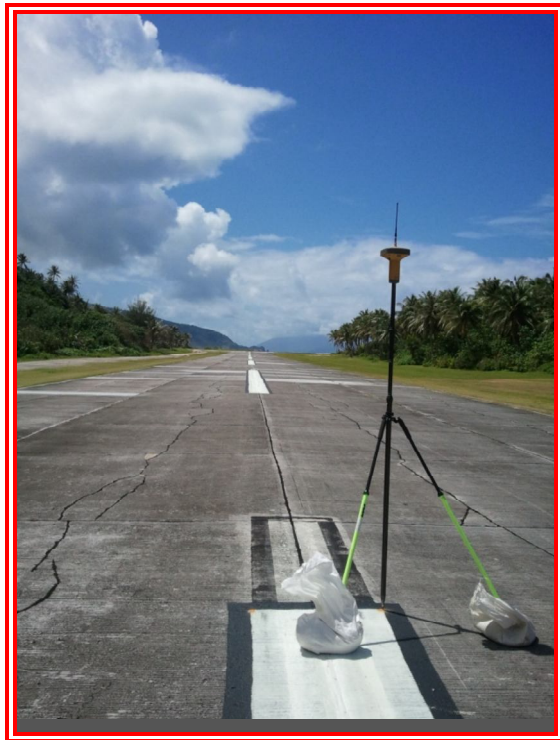
MARKER DESCRIPTION: PAINTE STRIPE CENTER LINE OF RUNWAY

LOCATION: MARK IS LOCATED ON THE SOUTHEAST CORNER OF AN EXISTING PAINT STRIPE ON THE CENTER LINE OF OFU RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-8

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley,, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: Ofu GCP-9

ANTENNA HEIGHT: 2M

START TIME: 11:39AM

STOP TIME: 12:16PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED EAST, NORTHEAST OF THE WINDSOCK  
AREA AND IT'S SOUTH OF OFU AIRPORT RUNWAY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-9

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : R8LCQJKQ5TS

PT#: Ofu GCP-10

ANTENNA HEIGHT: 2M

START TIME: 12:19PM

STOP TIME: 12:55PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED SOUTHEAST OF OFU AIPORT BUILDING.

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**SEE ATTACHED PHOTOS FOR DETAILS**

SKETCH AREA (NTS)





OFU GCP-10

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Ofu GCP-11

ANTENNA HEIGHT: 2M

START TIME: 1:34PM

STOP TIME: 2:05PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND  
PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED EAST OF THE ASTCA DCO BULDING  
AND WEST OF A SWAMP AREA.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-11

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Wesley, Tamilo

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: R8LCQJKQ5TS

PT#: Ofu GCP-12

ANTENNA HEIGHT: 2M

START TIME: 2:09PM

STOP TIME: 2:48PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND

PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED SOUTHEAST OF OFU "C" BENCH MARK

AND SOUTHWEST OF THE OFU DISPENSARY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-12

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Toma, Sam

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN : Q817R5XEWA0

PT#: Ofu GCP-13

ANTENNA HEIGHT: 2M

START TIME: 1:04PM

STOP TIME: 1:36PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 5/8" REABR SET FLUSH WITH THE GROUND

PANEL TARGET WAS SET ON THE MARK.

LOCATION: MARK IS LOCATED SOUH OF OFU RUNWAY AND SOUTH

OF SWAMP AREA.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)





OFU GCP-13

# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S OPERATOR: Toma

COUNTY: Manu'a tele VILLAGE: Ofu

ANTENNA TYPE: GR3 RECEIVER SN: P87ZRUPHQ80 PT#: OFU "C"

ANTENNA HEIGHT: 2M START TIME: 7:31AM STOP TIME: 2:50PM

LATITUDE: NA +/- LONGITUDE: NA +/-

MARKER DESCRIPTION: NOS SURVEY DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED NORTHWEST END OF THE OFU RUNWAY  
AND SOUTHWEST OF OFU DISPENSARY.

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



# POB MAPPING SERVICES

## GPS DATA SHEET

DATE: 9/14/12

PROJECT: Ofu Airport GCP'S

OPERATOR: Galen, Wei

COUNTY: Manu'a tele

VILLAGE: Ofu

ANTENNA TYPE: GR3

RECEIVER SN: P8ELL1T7T34

PT#: TOM

ANTENNA HEIGHT: 2M

START TIME: 7:31AM

STOP TIME: 2:50PM

LATITUDE: NA +/-

LONGITUDE: NA +/-

MARKER DESCRIPTION: 2" BRASS DISK SET IN CONCRETE.

LOCATION: MARK IS LOCATED NORTHEAST END OF OFU SEAWALL

SEE ATTACHED PHOTOS FOR DETAILS

SKETCH AREA (NTS)



OFU BASE-1 (OFU-C)



OFU BASE-2 (TOM)