



Dezembro de 2002

**GOVERNO DO
ESTADO DO CEARÁ**



SRH Secretaria dos Recursos Hídricos

Programa de Gerenciamento e Integração dos Recursos Hídricos do Estado do Ceará - PROGERIRH

Contrato

Nº 02/ PROGERIRH-PILOTO/CE/SRH 2001

Estudos de Alternativas, EIAS/RIMAS, Projetos Executivos, Levantamentos Cadastrais, Planos de Reassentamento e Avaliação Financeira e Econômica dos Projetos das Barragens João Guerra / Umari, Riacho da Serra, Ceará e Missi, e dos Projetos das Adutoras de Madalena, Lagoa do Mato, Alto Santo e Amontada

BARRAGEM MISSI VOLUME I - ESTUDOS BÁSICOS Tomo 3B - Estudos Cartográficos - Memória de Cálculos



MONTGOMERY WATSON





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1. APRESENTAÇÃO



1. APRESENTAÇÃO

O consórcio **Montgomery-Watson / Engesoft** e a **Secretaria dos Recursos Hídricos do Estado do Ceará (SRH-CE)** celebraram o contrato nº 02/PROGERIRH-PILOTO/CE/SRH 2001, que tem como objetivo o Estudo de Alternativas, EIA/RIMAS, Levantamentos Cadastrais, Planos de Reassentamento e Avaliação Financeira e Econômica dos Projetos das Barragens João Guerra / Umari, Riacho da Serra, Ceará e Missi, e dos Projetos das Adutoras de Madalena, Lagoa do Mato, Alto Santo e Amontada.

A ordem de serviço foi emitida em 05 de março de 2001 e imediatamente as equipes do consórcio iniciaram as atividades previstas no cronograma aprovado.

O presente relatório, denominado **Tomo 3B - Estudos Cartográficos - Memória de Cálculo**, é parte integrante do **Volume 1 - Estudos Básicos** e diz respeito à **Barragem Missi**, a qual tem por finalidade a criação de um reservatório no rio de mesmo nome, para o abastecimento da população da sede municipal de Amontada, Ceará.

Este tomo apresenta os anexos referentes à memória de cálculo relativa à transporte de coordenadas e apoio básico e suplementar para o levantamento aerofotogramétrico da bacia hidráulica.



MONTGOMERY WATSON



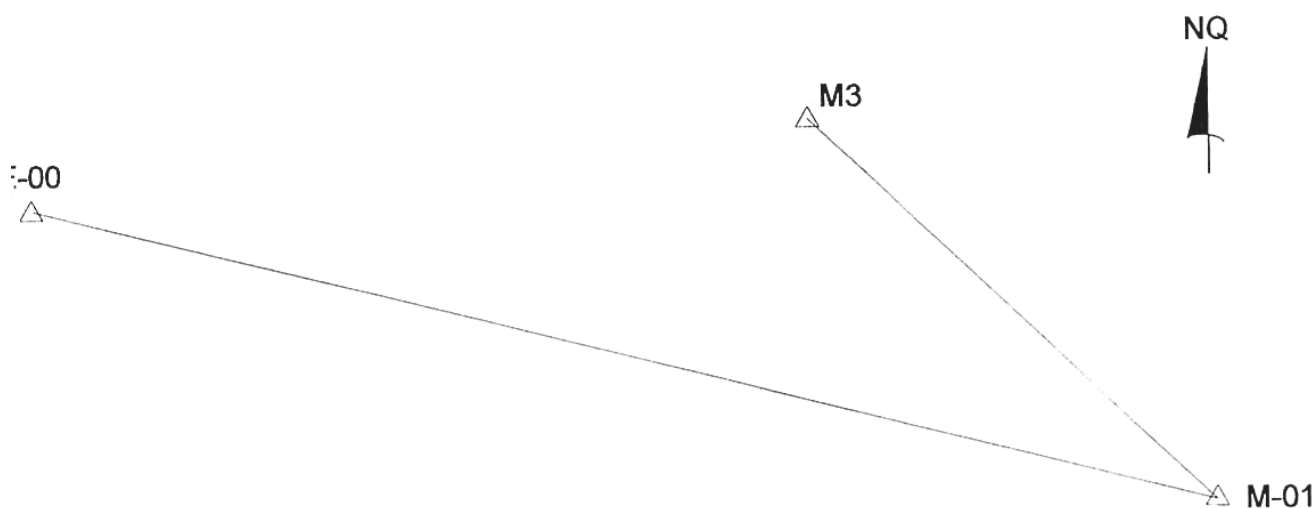
2. TRANSPORTE DE COORDENADAS



ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Projeto: Missi	Município: Amontada	Estado: Ceará
Origem: M-01	Marco Poligonal: E_00	Datum: SAD-69
Coordenada NORTE: 9.616.160,9114m	Coordenada ESTE: 403.796,996m	Altitude Ortométrica: 55,023m
Latitude Geodésica: 3°28'20.13451" S	Longitude Geodésica: 39°51'57,94373" WGr	

Projeto: Missi	Município: Amontada	Estado: Ceará
Origem M-01	Marco Poligonal Marco_M3	Datum SAD-69
Coordenada NORTE 9.616.287,736m	Coordenada ESTE 404.920,413m	Altitude Ortométrica 58,119m
Latitude Geodésica: 3°28'16.03775" S	Longitude Geodésica: 39°51'21.53275" WGr	





ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-01	Ponto Visado: M-02	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraima	Local: Sítio Conceição
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°28'34,29005"S	Coordenada Geodésica Longitude: 39°51'02,46218"W	
Coordenada UTM Norte: 9.615.727,785m	Coordenada UTM Este: 405.509,370m	Altura Geométrica: 50,841m Altitude Ortométrica: 55,715m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-01 – ENGESOFT – 07/2001.		

ITINERÁRIO	CROQUIS
<p>Partindo-se com 0,0Km da esquina da Rua Joaquim Tomé com CE-016 na cidade de Amontada, segue-se em direção ao Sítio Conceição, com 0,25Km toma-se a direita pela estrada carroçavel, com 9,25Km continua-se a esquerda, com 14,35Km chega-se na casa de propriedade do Sr. Magno Neto, onde o marco está localizado a 30m da casa junto a cerca.</p>	



```

Project information
GPS Survey          |25-character project name [ The | is in column 26.
]
2631A              |5-character session name
Project information

```

```

Known-station parameters
00                |Receiver identifier used in "LOGTIMES" file
000000           |Project station number
M-01             |4-character short name
FIXED STATION    |25-character long name
                |25-character comment field
0               |Position extraction (0=below,1=U-file,2=proj. file)
S   3 28 35.64640 |Latitude deg-min-sec (g=good;b=bad)
E 320 8 56.25824  |E-Longitude deg-min-sec (g=good;b=bad)
W  39 51 3.74176  |W-Longitude deg-min-sec (g=good;b=bad)
      55.7150     |Ellipsoidal height (m) (g=good;b=bad)
      0.0000     |North antenna offset(m)
      0.0000     |East antenna offset (m)
      1.8720 0.1318 0.0000 |Vert antenna offset (m): slant/radius/added_offset
      20.0       |Temperature (degrees C)
      50.0       |Humidity (percent)
      1010.0     |Pressure (millibars)
UM-01A01.263    |Measurement filename (restricted to 24 characters)
Known-station parameters

```

```

Unknown-station parameters
00                |Receiver identifier used in "LOGTIMES" file
000000           |Project station number
E_00            |4-character short name
UNKNOWN STATION |25-character long name
                |25-character comment field
0               |Position extraction (0=below,1=U-file,2=proj. file)
S   3 28 21.51057 |Latitude deg-min-sec (g=good;b=bad)
E 320 8 0.62665   |E-Longitude deg-min-sec (g=good;b=bad)
W  39 51 59.37335 |W-Longitude deg-min-sec (g=good;b=bad)
      74.2379     |Ellipsoidal height (m) (g=good;b=bad)
      0.0000     |North antenna offset(m)
      0.0000     |East antenna offset (m)
      1.9830 0.1318 0.0000 |Vert antenna offset (m): slant/radius/added_offset
      20.0       |Temperature (degrees C)
      50.0       |Humidity (percent)
      1010.0     |Pressure (millibars)
UEST0A01.263    |Measurement filename (restricted to 24 characters)
Unknown-station parameters

```

```

Run-time parameters
1                |First epoch to process
-1              |Final epoch to process (-1 = last available)
15.0           |Elevation cutoff angle (degrees)
1              |Data to process (0=Wdln;1=L1;2=L2;3=L1c;6=RpdSt)
0.010000      |Convergence criterion (meters)
00 00 00 00 00 00 00 |Omit these satellites (up to 7)
10            |Maximum iterations for t1sq and d1sq
00 00 00 00 00 00 00 |Forbidden reference SVs (up to 7)
yes           |Apply tropo delay correction
Run-time parameters

```

LINECOMP 5.2.00 7-18-94

FIXED U-File from L1 only receiver.
UNKWN U-File from L1 only receiver.

FIXED U-File used BROADCAST orbits.



UNKWN U-File used BROADCAST orbits.

Common start of two UFILES: 2001/09/20 12:03:40.00

Common end of two UFILES: 2001/09/20 12:43:20.00

Selected first epoch: 1

Selected last epoch: 477

For SV 2 there are 246 triple-difference measurements.

For SV 4 there are 476 triple-difference measurements.

For SV 5 there are 120 triple-difference measurements.

For SV 9 there are 476 triple-difference measurements.

For SV 10 there are 470 triple-difference measurements.

For SV 24 there are 476 triple-difference measurements.

For SV 26 there are 476 triple-difference measurements.

Epoch interval (seconds): 5.000000

THE TRIPLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 8.668121

num_meas = 2264 num_used = 2241 rms_resid = 0.002634(m)

Post-Fit Chisq = 4242.981 NDF = 5.188

Sigmax (m): 3.710178

Sigmay (m): 4.762501

Sigmaz (m): 1.401086

x y z

x 1.00

y 0.32y 1.00

z -0.55z -0.28z 1.00

del_station: -0.000038 0.005670 -0.000135

Station1: FIXED STATION

Station2: UNKNOWN STATION

M-01

E 00

Latitude: -3.47656844 -3 28 35.64640 -3.47263603 -3 28 21.48972

E-Long : 320.14896062 320 8 56.25824 320.13354645 320 8 0.76721

W-Long : 39.85103938 39 51 3.74176 39.86645355 39 51 59.23279

E-Height: 55.7150 55.1062

Baseline vector: -1077.9520 -1331.2766 434.0809

Mark1 xyz : 4887670.3159 -4079635.2139 -384191.2987

Az1 E1 D1 : 284.24490 -0.0277 1767.1174

E1 N1 U1 : -1712.7764 434.8434 -0.6088

Mark2 xyz : 4886592.3638 -4080966.4905 -383757.2177

Az2 E2 D2 : 104.24584 0.0118 1767.1174

E2 N2 U2 : 1712.7834 -434.8433 0.6088

Double-Difference Epochs:

Prn: 2 Start epoch: 2 End epoch: 247

Prn: 4 Start epoch: 2 End epoch: 477

Prn: 5 Start epoch: 358 End epoch: 477

Prn: 9 Start epoch: 2 End epoch: 477

Prn: 10 Start epoch: 8 End epoch: 477

Prn: 24 Start epoch: 2 End epoch: 477

Prn: 26 Start epoch: 2 End epoch: 477

THE FLOAT DOUBLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 0.178217 Wavelength = 0.190294 (m/cycle)

num_meas = 2265 num_used = 2254 rms_resid = 0.007761(m)

Post-Fit Chisq = 2954.360 NDF = 5.218

Reference SV: 24

SV Ambiguity FIT Meas SV Ambiguity FIT Meas

2 -4332396.952f 0.038 241 4 -4851232.336f 0.044 476

5 3488526.501f 0.067 116 9 4034178.664f 0.037 475

10 -1077116.122f 0.038 470 26 -5007685.353f 0.036 476



```

SigmaX (m):      0.065520
SigmaY (m):      0.075680
SigmaZ (m):      0.034924
SigmaN (cy):     0.392932
SigmaN (cy):     0.186844
SigmaN (cy):     0.343415
SigmaN (cy):     0.275646
SigmaN (cy):     0.254765
SigmaN (cy):     0.396643
  x      y      z      N      N      N      N      N      N
x 1.00
y 0.35y 1.00
z-0.42z-0.06z 1.00
N 0.30N 0.99N-0.03N 1.00
N 0.36N 0.88N-0.47N 0.87N 1.00
N-0.90N-0.45N 0.04N-0.40N-0.27N 1.00
N-0.82N-0.71N 0.01N-0.67N-0.50N 0.93N 1.00
N-0.53N 0.37N 0.81N 0.41N 0.04N 0.19N-0.02N 1.00
N-0.91N-0.58N 0.63N-0.53N-0.67N 0.75N 0.77N 0.50N 1.00

```

```

del_station: -0.000896 -0.000076 0.000851
              Station1: FIXED STATION              Station2: UNKNOWN STATION
                    M-01                              E_00
Latitude:  -3.47656844  -3 28 35.64640             -3.47263628  -3 28 21.49059
E-Long  : 320.14896062 320 8 56.25824             320.13354722 320 8 0.77000
W-Long  : 39.85103938 39 51 3.74176               39.86645278 39 51 59.23000
E-Height: 55.7150                                55.0762

```

```
Baseline vector:      -1077.9210      -1331.1902      434.0559
```

```

Mark1_xyz : 4887670.3159 -4079635.2139 -384191.2987
Az1 E11 D1 : 284.24475 -0.0287 1767.0273
E1 N1 U1 : -1712.6902 434.8166 -0.6388
Mark2_xyz : 4886592.3949 -4080966.4041 -383757.2427
Az2 E12 D2 : 104.24568 0.0128 1767.0273
E2 N2 U2 : 1712.6972 -434.8165 0.6388

```

AMBIGUITY RESOLUTION

	1	2	3	4
Abs Contrast	0.000	0.000	0.000	0.000
Contrast		96.825	99.999	100.000
Change Chi2	10329.475	17929.930	34588.863	40970.924
Bias S24: 2	-4332396	-4332397	-4332398	-4332395
Bias S24: 4	-4851232	-4851232	-4851233	-4851232
Bias S24: 5	3488526	3488527	3488525	3488525
Bias S24: 9	4034178	4034179	4034178	4034177
Bias S24:10	-1077116	-1077117	-1077117	-1077115
Bias S24:26	-5007686	-5007686	-5007686	-5007686
NDF=62.3500 Chi2=2954.3599				

	1	2	3	4
Abs Contrast	0.000	0.000	0.000	0.000
Contrast		98.917	99.999	100.000
Change Chi2	8540.701	17277.907	31512.863	32465.213
Bias S24: 2	-4332396	-4332397	-4332397	-4332398
Bias S24: 4	-4851232	-4851232	-4851232	-4851233
Bias S24: 9	4034178	4034179	4034178	4034178
Bias S24:10	-1077116	-1077117	-1077117	-1077117
Bias S24:26	-5007686	-5007686	-5007687	-5007686
NDF=62.3500 Chi2=2954.3599				

	1	2	3	4
Abs Contrast	0.007	0.000	0.000	0.000
Contrast		88.854	99.913	99.983
Change Chi2	4878.763	7629.235	14158.842	16254.870
Bias S24: 2	-4332396	-4332398	-4332397	-4332396
Bias S24: 4	-4851232	-4851233	-4851232	-4851232



```

Bias S24: 9      4034178      4034179      4034179      4034179
Bias S24:10     -1077116     -1077116     -1077117     -1077115
NDF=62.3500 Chi2=2954.3599
              1              2              3              4
Abs Contrast    0.009      0.000      0.000      0.000
Contrast        89.121      97.263      99.981
Change Chi2     4811.970    7600.774    9587.961    16079.699
Bias S24: 2     -4332396    -4332398    -4332397    -4332396
Bias S24: 4     -4851232    -4851233    -4851232    -4851232
Bias S24:10     -1077116    -1077116    -1077117    -1077115
NDF=62.3500 Chi2=2954.3599
              1              2              3              4
Abs Contrast    2.426      0.000      0.000      0.000
Contrast        99.848      99.975     100.000
Change Chi2     1922.837    7374.061    8849.892    12471.762
Bias S24: 4     -4851232    -4851233    -4851232    -4851232
Bias S24:10     -1077116    -1077116    -1077117    -1077115
NDF=62.3500 Chi2=2954.3599
              1              2              3              4
Abs Contrast    0.004      0.000      0.000      0.000
Contrast       100.000     100.000     100.000
Change Chi2     8406.638    40404.059   78416.180   80362.233
Bias S24: 2     -4332396    -4332397    -4332396    -4332396
Bias S24: 5      3488526     3488527     3488525     3488525
Bias S24: 9      4034178     4034179     4034177     4034178
Bias S24:26     -5007686    -5007685    -5007687    -5007686
NDF=64.3500 Chi2=4877.1967

```

THE FIXED DOUBLE DIFFERENCE SOLUTION (L1)

```

Measure of geometry: 0.020753      Wavelength = 0.190294 (m/cycle)
num meas = 2265      num_used = 2226      rms_resid = 0.016487(m)
Post-Fit Chisq = 12531.485      NDF = 5.153

```

Reference SV: 24

Integer Search Ratio = 99.848

SV	Ambiguity	FIT	Meas	SV	Ambiguity	FIT	Meas
2	-4332396.000X	0.058	246	4	-4851232.000X	0.056	476
5	3488526.000X	0.114	121	9	4034178.000X	0.070	476
10	-1077116.000X	0.126	431	26	-5007686.000X	0.088	476

```

Sigmax (m):      0.019119
Sigmay (m):      0.015058
Sigmaz (m):      0.007895
x      y      z
x 1.00
y-0.66y 1.00
z 0.15z-0.09z 1.00

```

del_station: 0.002620 0.001111 0.003798

Station1: FIXED STATION

Station2: UNKNOWN STATION

```

M-01      E_00
Latitude: -3.47656844 -3 28 35.64640      -3.47263630 -3 28 21.49069
E-Long : 320.14896062 320 8 56.25824      320.13354899 320 8 0.77635
W-Long : 39.85103938 39 51 3.74176      39.86645101 39 51 59.22365
E-Height: 55.7150      55.0228

```

Baseline vector: -1077.8363 -1331.0054 434.0563

```

Mark1 xyz : 4887670.3159 -4079635.2139 -384191.2987
Az1 E1 D1 : 284.24622 -0.0304 1766.8365
E1 N1 U1 : -1712.4941 434.8136 -0.6922
Mark2 xyz : 4886592.4796 -4080966.2193 -383757.2424
Az2 E1 D2 : 104.24715 0.0145 1766.8365
E2 N2 U2 : 1712.5010 -434.8136 0.6922
Thu Sep 20 10:51:52 2001

```



```

Project information
GPS Survey          |25-character project name [ The | is in column 26.
]
2621A              |5-character session name
Project information

Known-station parameters
00                 |Receiver identifier used in "LOGTIMES" file
000000            |Project station number
M-01              |4-character short name
FIXED STATION     |25-character long name
                  |25-character comment field
-----
0                 |Position extraction (0=below,1=U-file,2=proj. file)
S   3 28 35.64640 |Latitude deg-min-sec (g=good;b=bad)
E 320 8 56.25824  |E-Longitude deg-min-sec (g=good;b=bad)
W  39 51 3.74176  |W-Longitude deg-min-sec (g=good;b=bad)
      55.7150      |Ellipsoidal height (m) (g=good;b=bad)
      0.0000       |North antenna offset(m)
      0.0000       |East antenna offset (m)
      1.8570 0.1318 0.0000 |Vert antenna offset (m): slant/radius/added_offset
      20.0         |Temperature (degrees C)
      50.0         |Humidity (percent)
      1010.0       |Pressure (millibars)
UBASEA01.262     |Measurement filename (restricted to 24 characters)
Known-station parameters

Unknown-station parameters
00                 |Receiver identifier used in "LOGTIMES" file
000000            |Project station number
Marco_M3         |4-character short name
UNKNOWN STATION  |25-character long name
                  |25-character comment field
-----
0                 |Position extraction (0=below,1=U-file,2=proj. file)
S   3 28 17.52502 |Latitude deg-min-sec (g=good;b=bad)
E 320 8 37.25753  |E-Longitude deg-min-sec (g=good;b=bad)
W  39 51 22.74247 |W-Longitude deg-min-sec (g=good;b=bad)
      79.7221      |Ellipsoidal height (m) (g=good;b=bad)
      0.0000       |North antenna offset(m)
      0.0000       |East antenna offset (m)
      1.9210 0.1318 0.0000 |Vert antenna offset (m): slant/radius/added_offset
      20.0         |Temperature (degrees C)
      50.0         |Humidity (percent)
      1010.0       |Pressure (millibars)
U00M3A01.262    |Measurement filename (restricted to 24 characters)
Unknown-station parameters

Run-time parameters
1                 |First epoch to process
-1                |Final epoch to process (-1 = last available)
15.0             |Elevation cutoff angle (degrees)
1                |Data to process (0=Wdl;n;1=L1;2=L2;3=L1c;6=RpdSt)
0.010000        |Convergence criterion (meters)
00 00 00 00 00 00 00 |Omit these satellites (up to 7)
10              |Maximum iterations for tlsx and dlsg
00 00 00 00 00 00 00 |Forbidden reference SVs (up to 7)
yes             |Apply tropo delay correction
Run-time parameters

LINECOMP 5.2.00 7-18-94

FIXED U-File from L1 only receiver.
UNKWN U-File from L1 only receiver.

FIXED U-File used BROADCAST orbits.

```



UNKWN U-File used BROADCAST orbits.

Common start of two UFILES: 2001/09/19 19:49:10.00
Common end of two UFILES: 2001/09/19 20:16:50.00

Selected first epoch: 1
Selected last epoch: 333
For SV 3 there are 269 triple-difference measurements.
For SV 6 there are 332 triple-difference measurements.
For SV 14 there are 332 triple-difference measurements.
For SV 15 there are 332 triple-difference measurements.
For SV 17 there are 332 triple-difference measurements.
For SV 18 there are 332 triple-difference measurements.
For SV 21 there are 332 triple-difference measurements.
For SV 22 there are 332 triple-difference measurements.
For SV 29 there are 332 triple-difference measurements.
Epoch interval (seconds): 5.000000

THE TRIPLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 7.376692
num_meas = 2593 num_used = 2593 rms_resid = 0.004143(m)
Post-Fit Chisq = 16465.191 NDF = 6.002

Sigmax (m): 7.375456
Sigmay (m): 5.828789
Sigmaz (m): 2.218411
x 1.00
y 0.52y 1.00
z 0.13z-0.41z 1.00

del_station: 0.000007 0.000023 -0.000009

Station1: FIXED STATION Station2: UNKNOWN STATION
M-01 Marco_M3
Latitude: -3.47656844 -3 28 35.64640 -3.47149820 -3 28 17.39353
E-Long : 320.14896062 320 8 56.25824 320.14366321 320 8 37.18757
W-Long : 39.85103938 39 51 3.74176 39.85633679 39 51 22.81243
E-Height: 55.7150 58.1196

Baseline vector: -349.2897 -475.1939 559.4881

Mark1_xyz : 4887670.3159 -4079635.2139 -384191.2987
Az1 E11 D1 : 313.60576 0.1658 812.9203
E1 N1 U1 : -588.6318 560.6641 2.4046
Mark2_xyz : 4887321.0262 -4080110.4078 -383631.8105
Az2 E12 D2 : 133.60608 -0.1731 812.9203
E2 N2 U2 : 588.6352 -560.6642 -2.4046

Double-Difference Epochs:

Prn: 3 Start epoch: 65 End epoch: 333
Prn: 6 Start epoch: 2 End epoch: 333
Prn: 14 Start epoch: 2 End epoch: 333
Prn: 15 Start epoch: 2 End epoch: 333
Prn: 17 Start epoch: 2 End epoch: 333
Prn: 18 Start epoch: 2 End epoch: 333
Prn: 21 Start epoch: 2 End epoch: 333
Prn: 22 Start epoch: 2 End epoch: 333
Prn: 29 Start epoch: 2 End epoch: 333

THE FLOAT DOUBLE DIFFERENCE SOLUTION (L1)

Measure of geometry: 0.209998 Wavelength = 0.190294 (m/cycle)
num_meas = 2594 num_used = 2593 rms_resid = 0.007301(m)
Post-Fit Chisq = 4090.485 NDF = 6.002

Reference SV: 14



SV	Ambiguity	FIT	Meas	SV	Ambiguity	FIT	Meas
3	2612208.976f	0.044	269	6	-6951799.001f	0.035	332
15	-3598214.012f	0.037	332	17	-4573146.013f	0.047	332
18	-8589397.997f	0.045	332	21	-5740255.999f	0.030	332
22	-2460054.008f	0.039	332	29	1499591.976f	0.025	332

```

SigmaX (m): 0.098548
SigmaY (m): 0.084553
SigmaZ (m): 0.043843
SigmaN (cy): 0.533532
SigmaN (cy): 0.327648
SigmaN (cy): 0.388245
SigmaN (cy): 0.472334
SigmaN (cy): 0.378397
SigmaN (cy): 0.381143
SigmaN (cy): 0.596638
SigmaN (cy): 0.188475
x y z N N N N N N N
x 1.00
y 0.49y 1.00
z 0.21z 0.01z 1.00
N-0.86N-0.39N-0.67N 1.00
N 0.67N 0.96N 0.15N-0.59N 1.00
N 0.02N 0.63N-0.75N 0.36N 0.47N 1.00
N 0.32N 0.86N-0.49N 0.00N 0.76N 0.92N 1.00
N-0.21N 0.43N-0.84N 0.58N 0.24N 0.96N 0.80N 1.00
N-0.78N-0.42N-0.76N 0.98N-0.60N 0.39N 0.02N 0.61N 1.00
N-0.96N-0.67N-0.30N 0.89N-0.82N-0.09N-0.43N 0.16N 0.84N 1.00
N-0.91N-0.58N 0.13N 0.63N-0.68N-0.34N-0.56N-0.13N 0.53N 0.88N 1.00

```

```

del_station: 0.000161 -0.000359 0.000088
Station1: FIXED STATION
M-01
Station2: UNKNOWN STATION
Marco_M3
Latitude: -3.47656844 -3 28 35.64640 -3.47149830 -3 28 17.39389
E-Long : 320.14896062 320 8 56.25824 320.14366324 320 8 37.18766
W-Long : 39.85103938 39 51 3.74176 39.85633676 39 51 22.81234
E-Height: 55.7150 58.1257

```

Baseline vector: -349.2838 -475.1952 559.4765

```

Mark1_xyz : 4887670.3159 -4079635.2139 -384191.2987
Az1 E11 D1 : 313.60532 0.1662 812.9106
E1 N1 U1 : -588.6291 560.6528 2.4107
Mark2_xyz : 4887321.0320 -4080110.4091 -383631.8221
Az2 E12 D2 : 133.60564 -0.1736 812.9106
E2 N2 U2 : 588.6325 -560.6530 -2.4107

```

AMBIGUITY RESOLUTION

	1	2	3	4
Abs Contrast	34.727	0.000	0.000	0.000
Contrast		100.000	100.000	100.000
Change Chi2	389.771	80243.650	80552.772	88346.363
Bias S14: 3	2612209	2612208	2612210	2612208
Bias S14: 6	-6951799	-6951798	-6951800	-6951799
Bias S14:15	-3598214	-3598214	-3598214	-3598215
Bias S14:17	-4573146	-4573145	-4573147	-4573147
Bias S14:18	-8589398	-8589398	-8589398	-8589399
Bias S14:21	-5740256	-5740257	-5740255	-5740257
Bias S14:22	-2460054	-2460055	-2460053	-2460054
Bias S14:29	1499592	1499592	1499592	1499592

NDF=72.8250 Chi2=4090.4847

THE FIXED DOUBLE DIFFERENCE SOLUTION (L1)

```

Measure of geometry: 0.024461 Wavelength = 0.190294 (m/cycle)
num_meas = 2594 num_used = 2594 rms_resid = 0.007667(m)

```



Post-Fit Chisq = 4513.118 NDF = 6.005

Reference SV: 14 Integer Search Ratio = 100.000

SV	Ambiguity	FIT	Meas	SV	Ambiguity	FIT	Meas
3	2612209.000X	0.047	270	6	-6951799.000X	0.037	332
15	-3598214.000X	0.038	332	17	-4573146.000X	0.048	332
18	-8589398.000X	0.049	332	21	-5740256.000X	0.029	332
22	-2460054.000X	0.041	332	29	1499592.000X	0.031	332

Sigmax (m): 0.012270
 Sigmay (m): 0.010294
 Sigmaz (m): 0.004956

x y z
 x 1.00
 y -0.86y 1.00
 z -0.67z 0.70z 1.00

del_station: 0.000055 -0.000004 0.000014
 Station1: FIXED STATION

Station2: UNKNOWN STATION
 Marco_M3
 Latitude: -3.47149829 -3 28 17.39385
 E-Long : 320.14366323 320 8 37.18764
 W-Long : 39.85633677 39 51 22.81236
 E-Height: 58.1188

Baseline vector: -349.2895 -475.1915 559.4782

Mark1_xyz : 4887670.3159 -4079635.2139 -384191.2987
 Az1 E1 D1 : 313.60535 0.1658 812.9120
 E1 N1 U1 : -588.6299 560.6541 2.4038
 Mark2_xyz : 4887321.0264 -4080110.4054 -383631.8204
 Az2 E2 D2 : 133.60567 -0.1731 812.9120
 E2 N2 U2 : 588.6332 -560.6543 -2.4038
 Wed Sep 19 20:32:59 2001



MONTGOMERY WATSON



3. APOIO BÁSICO E SUPLEMENTAR PARA O LEVANTAMENTO AEROFOTOGRAMÉTRICO



ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-01	Ponto Visado: M-02	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraíma	Local: Sítio Conceição
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°28'34,29005"S	Coordenada Geodésica Longitude: 39°51'02,46218"W	
Coordenada UTM Norte: 9.615.727,785m	Coordenada UTM Este: 405.509,370m	Altura Geométrica: 50,841m Altitude Ortométrica: 55,715m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-01 – ENGESOFT – 07/2001.		

ITINERÁRIO	CROQUIS
<p>Partindo-se com 0,0Km da esquina da Rua Joaquim Tomé com CE-016 na cidade de Amontada, segue-se em direção ao Sítio Conceição, com 0,25Km toma-se a direita pela estrada carroçavel, com 9,25Km continua-se a esquerda, com 14,35Km chega-se na casa de propriedade do Sr. Magno Neto, onde o marco está localizado a 30m da casa junto a cerca.</p>	





ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-02	Ponto Visado: M-01	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraima	Local: Sítio Conceição
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°28'33,48452"S	Coordenada Geodésica Longitude: 39°50'57,76627"W	
Coordenada UTM Norte: 9.615.752,651m	Coordenada UTM Este: 405.654,248m	Altura Geométrica: 49,357m Altitude Ortométrica: 54,223m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-02 – ENGESOFT – 07/2001.		

ITINERÁRIO	CROQUIS
<p>Partindo-se com 0,0Km da esquina da Rua Joaquim Tomé com CE-016 na cidade de Amontada, segue-se em direção ao Sítio Conceição, com 0,25Km toma-se a direita pela estrada carroçavel, com 14,35Km chega-se na casa de propriedade do Sr. Magno Neto, toma-se a esquerda com 14,50Km chega-se ao marco junto a cerca.</p>	



ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-03	Ponto Visado:	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraima	Local: Sítio Cascavel
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°29'59,63231"S		Coordenada Geodésica Longitude: 39°5220',84742"W
Coordenada UTM Norte: 9.613.104,924m	Coordenada UTM Este: 403.093,079m	Altura Geométrica: 54,880m Altitude Ortométrica: 59,835m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-03 – ENGESOFT – 07/2001.		
ITINERÁRIO		CROQUIS
<p>Partindo-se com 0,0Km do trevo na CE-016 com a Rodovia que dá acesso a cidade de Miraima, toma-se em direção a mesma com 19,75Km na localidade de Barra dos Garrotes, toma-se a esquerda pela estrada carroçavel para o Sítio Cascavel, com 23,8Km chega-se ao ao marco que está no canto da cerca antes da rede de transmissão de energia na Propriedade do Sr. Isaac Marques da Silva.</p>		





ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-04	Ponto Visado:	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraíma	Local: Sítio Passagem
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°32'40,60120"S	Coordenada Geodésica Longitude: 39°53'07,23343"W	
Coordenada UTM Norte: 9.608.160,595m	Coordenada UTM Este: 401.666,476m	Altura Geométrica: 56,765m Altitude Ortométrica: 61,969m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-04 – ENGESOFT – 07/2001.		

ITINERÁRIO	CROQUIS
<p>Partindo-se com 0,0Km do trevo na CE-016 com a Rodovia que dá acesso a cidade de Miraíma, toma-se em direção a mesma com 19,75Km na localidade de Barra dos Garrotes, toma-se a esquerda pela estrada carroçavel para o Sítio Cascavel, com 24,1Km toma-se a direita, com 29,8Km + 30m chega-se ao marco que está localizado no lado direito da estrada ao lado da casa do Sr. Manoel Aures da Silva.</p>	<p>The diagram illustrates the route to the M-04 marker. It starts at CE-016 (0,0 Km) and goes north to Barra dos Garrotes (19,75 Km). From there, it turns left onto a road labeled 'POV. RIACHO' and then right to reach the M-04 marker (29,80 Km). A house is shown near the marker. The diagram also shows the location of Miraíma and the road CE-016 with directions to Amontada and Morrinhos.</p>





ENGESOFT ENGENHARIA E CONSULTORIA LTDA

Vértice: M-05	Ponto Visado:	Obra/Ano: O-739/2001
Estado: Ceará	Município: Miraima	Local: Sítio São Braz
Origem: V. Bastiões (IBGE)	MC: 39° W	Datum: SAD-69
Coordenada Geodésica Latitude: 03°31'28,03567"S	Coordenada Geodésica Longitude: 39°52'14,94172"W	
Coordenada UTM Norte: 9.610.390,438m	Coordenada UTM Este: 403.277,834m	Altura Geométrica: 55,076m Altitude Ortométrica: 60,171m
Descrição: Marco de concreto de formato tronco piramidal medindo, (10x12x50) cm, com chapa de bronze no centro do topo, constando: M-05 – ENGESOFT – 07/2001.		
ITINERÁRIO	CROQUIS	
Partindo-se com 0,0Km do trevo na CE-016 com a Rodovia que dá acesso a cidade de Miraima, toma-se em direção a mesma com 19,75Km na localidade de Barra dos Garrotes, toma-se a esquerda pela estrada carroçavel para o Sítio Cascavel, com 24,1Km toma-se a direita, com 27,0Km toma-se a esquerda, atravessando o Rio Missi, com 27,7Km chega-se na casa do Sr. Vicente Alexandre Souza, o marco encontra-se no canto da cerca na frente da casa.		



ENGESOFT Engenharia e Projetos S/A
MAPEAMENTO AEROFOTOGRAMÉTRICO
APOIO BÁSICO

Cliente: ENGESOFT Local: MISSI/CE
Obra: O-739 Operador: WIVEAR Data: 18-Jul-2001

Transformação de Sistemas Geodésicos

Elipsóide de origem: WGS_84 a=6378137.000 b=6356752.314
Elipsóide de destino: SAD_69 a=6378160.000 b=6356774.719
Parâmetros para transformação: dX = 66.870 dY = -4.370 dZ = 38.520

Coordenadas referidas ao Sistema WGS_84

Ponto	Latitude	Longitude	h
AUX01	3°28'34.83985"S	39°50'59.04497"W	020.661
AUX02	3°18'44.44340"S	39°54'03.86355"W	007.410
M01	3°28'35.64633"S	39°51'03.74175"W	022.137
M02	3°28'34.84080"S	39°50'59.04579"W	020.651
M03	3°30'00.98924"S	39°52'22.12769"W	026.208
M04	3°32'41.95939"S	39°53'08.51414"W	028.135
M05	3°31'29.39330"S	39°52'16.22196"W	026.421
RN517U	3°24'20.13252"S	39°44'39.78406"W	010.913
RN518B	3°21'36.15712"S	39°49'58.30669"W	000.850
VBASTIOES	3°17'59.89800"S	39°37'35.17695"W	024.664
VCHORA	3°19'52.83087"S	40°04'04.39232"W	254.708



ENGESOFT Engenharia e Projetos S/A
MAPEAMENTO AEROFOTOGRAFÉTRICO
APOIO BÁSICO

Cliente: ENGESOFT Local: MISSI/CE
Obra: O-739 Operador: WIVEAR Data: 18-Jul-2001

Transformação de Sistemas Geodésicos

Elipsóide de origem: WGS_84 a=6378137.000 b=6356752.314
Elipsóide de destino: SAD_69 a=6378160.000 b=6356774.719
Parâmetros para transformação: dX = 66.870 dY = -4.370 dZ = 38.520

Coordenadas referidas ao Sistema SAD_69

Ponto	Latitude	Longitude	h
AUX01	3°28'33.48357"S	39°50'57.76544"W	049.366
AUX02	3°18'43.09189"S	39°54'02.58267"W	036.199
M01	3°28'34.29005"S	39°51'02.46218"W	050.841
M02	3°28'33.48452"S	39°50'57.76627"W	049.357
M03	3°29'59.63231"S	39°52'20.84742"W	054.880
M04	3°32'40.60120"S	39°53'07.23343"W	056.765
M05	3°31'28.03567"S	39°52'14.94172"W	055.076
RN517U	3°24'18.77814"S	39°44'38.50785"W	039.742
RN518B	3°21'34.80416"S	39°49'57.02783"W	029.652
VBASTIOES	3°17'58.54651"S	39°37'33.90450"W	053.651
VCHORA	3°19'51.47909"S	40°04'03.10637"W	283.368



ENGESOFT Engenharia e Projetos S/A
MAPEAMENTO AEROFOTOGRAMÉTRICO
APOIO BÁSICO

Cliente: ENGESOFT Local: MISSI/CE
Obra: O-739 Operador: WIVEAR Data: 18-Jul-2001

Transformação de Coordenadas Geodésicas em Planoretangulares TM

Elipsóide: SAD_69 a=6378160.000 b=6356774.719

Meridiano Central: 39°00'00.00"W Hemisfério Sul

Coordenadas UTM

Ponto	N (m)	E (m)	h (m)	Convergência	kapa
AUX01	9615752.680	405654.274	49.366	0°03'05.41"	0.99971018
AUX02	9633877.011	399934.506	36.199	0°03'07.35"	0.99972395
M01	9615727.785	405509.370	50.841	0°03'05.70"	0.99971052
M02	9615752.651	405654.248	49.357	0°03'05.41"	0.99971018
M03	9613104.924	403093.079	54.880	0°03'11.75"	0.99971624
M04	9608160.595	401666.476	56.765	0°03'17.07"	0.99971969
M05	9610390.438	403277.834	55.076	0°03'12.73"	0.99971580
RN517U	9623583.683	417350.673	39.742	0°02'39.11"	0.99968455
RN518B	9628610.834	407517.296	29.652	0°02'55.65"	0.99970587
VBASTIOES	9635268.299	430445.548	53.651	0°02'09.73"	0.99965988
VCHORA	9631758.497	381402.747	283.368	0°03'43.32"	0.99977411

OBS.: Alturas Geométricas, referidas ao elipsóide.



ENGESOFT Engenharia e Projetos S/A
MAPEAMENTO AEROFOTOGRAMÉTRICO
APOIO BÁSICO

Cliente: ENGESOFT Local: MISSI/CE
Obra: O-739 Operador: WIVEAR Data: 18-Jul-2001

Coordenadas Geodésicas Planoretangulares - UTM

Elipsóide: SAD_69 a=6378160.000 b=6356774.719
Meridiano Central: 39°00'00.00"W Hemisfério Sul

Ponto	N (m)	E (m)	H (m)
AUX01	9615752.680	405654.274	53.80
AUX02	9633877.011	399934.506	40.63
M01	9615727.785	405509.370	55.715
M02	9615752.651	405654.248	54.223
M03	9613104.924	403093.079	59.835
M04	9608160.595	401666.476	61.969
M05	9610390.438	403277.834	60.171
RN517U	9623583.683	417350.673	44.012
RN518B	9628610.834	407517.296	34.254
VBASTIOES	9635268.299	430445.548	53.65
VCHORA	9631758.497	381402.747	288.64

OBS.: Altitudes Ortométricas, com milímetros, obtidas
por nivelamento geométrico e com centímetros,
obtidas por diferença geoidal.



ENGESOFT Engenharia e Projetos S/A
MAPEAMENTO AEROFOTOGRAMÉTRICO
APOIO SUPLEMENTAR

Cliente: ENGESOFT Local: MISSI/CE
Obra: O-739 Operador: WIVEAR Data: 18-Jul-2001

Coordenadas Geodésicas Planoretangulares - UTM

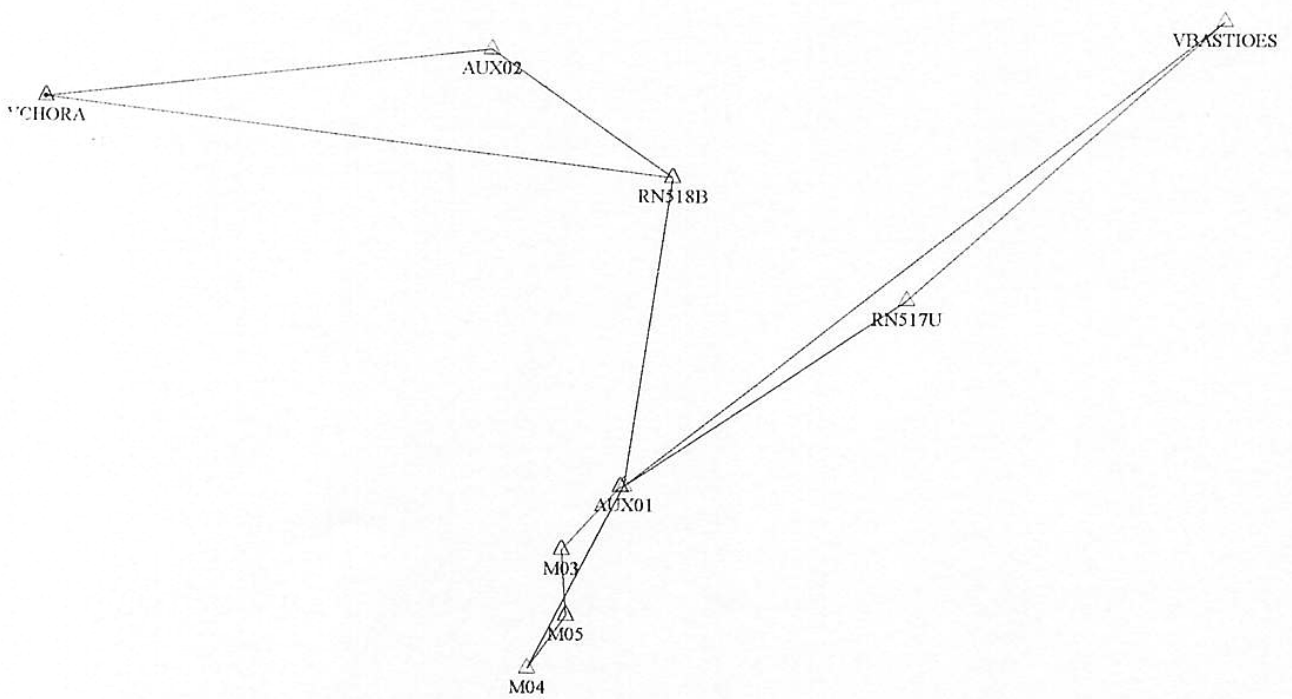
Elipsóide: SAD_69 a=6378160.000 b=6356774.719
Meridiano Central: 39°00'00.00"W Hemisfério Sul

Ponto	N (m)	E (m)	H (m)
HV01	9618851.981	401520.304	46.64
HV02	9613687.819	401280.257	51.69
HV03	9609595.420	401068.437	59.77
HV04	9605761.258	401842.243	67.81
HV05	9618792.950	403215.576	47.62
HV06	9613801.610	403414.266	48.54
HV07	9609287.979	403577.784	55.30
HV08	9605822.885	403610.943	75.33
HV09	9618988.155	405819.373	45.11
HV10	9615665.521	405469.888	53.61
HV11	9613059.397	405739.686	71.01
HV12	9608947.393	405470.601	70.72
HV13	9606291.960	405730.679	76.80
HV14	9618913.737	407679.222	63.23
HV15	9615467.542	407552.881	62.00
HV16	9612395.766	407897.272	77.89
HV17	9606682.022	408113.739	90.43
M01	9615727.785	405509.370	55.715
M03	9613104.924	403093.079	59.835
M04	9608160.595	401666.476	61.20
M05	9610390.438	403277.834	60.171

OBS.: Altitudes Ortométricas, com milímetros, obtidas por nivelamento geométrico e com centímetros, obtidas ppor diferença geoidal.



Network Map: MIM





COORDINATE ADJUSTMENT SUMMARY
 NETWORK = MIM
 TIME = Wed Jul 18 10:26:53 2001

Datum = WGS-84
 Coordinate System = Geographic
 Zone = Global

Network Adjustment Constraints:

- 1 fixed coordinates in y
- 1 fixed coordinates in x
- 1 fixed coordinates in H

POINT	NAME	OLD COORDS	ADJUST	NEW COORDS	1.00σ
1	AUX01				
	LAT=	3° 28' 34.839848"	+0.000000"	3° 28' 34.839849"	0.011854m
	LON=	39° 50' 59.044964"	-0.000005"	39° 50' 59.044969"	0.011996m
	ELL HT=	20.6654m	-0.0044m	20.6610m	0.038649m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
1	AUX02				
	LAT=	3° 18' 44.443399"	+0.000003"	3° 18' 44.443396"	0.014758m
	LON=	39° 54' 03.863550"	-0.000004"	39° 54' 03.863554"	0.015122m
	ELL HT=	7.4141m	-0.0041m	7.4100m	0.043177m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
3	M01				
	LAT=	3° 28' 35.646326"	+0.000000"	3° 28' 35.646326"	0.008288m
	LON=	39° 51' 03.741742"	-0.000005"	39° 51' 03.741747"	0.008486m
	ELL HT=	22.1409m	-0.0044m	22.1365m	0.038131m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
4	M02				
	LAT=	3° 28' 34.840795"	+0.000000"	3° 28' 34.840795"	0.007125m
	LON=	39° 50' 59.045785"	-0.000005"	39° 50' 59.045791"	0.007353m
	ELL HT=	20.6557m	-0.0044m	20.6513m	0.038027m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
5	M03				
	LAT=	3° 30' 00.989240"	+0.000000"	3° 30' 00.989240"	0.009307m
	LON=	39° 52' 22.127680"	-0.000005"	39° 52' 22.127686"	0.009483m
	ELL HT=	26.2123m	-0.0044m	26.2079m	0.038236m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
6	M04				
	LAT=	3° 32' 41.959390"	+0.000000"	3° 32' 41.959391"	0.011072m
	LON=	39° 53' 08.514139"	-0.000005"	39° 53' 08.514144"	0.011222m
	ELL HT=	28.1391m	-0.0044m	28.1347m	0.038546m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
7	M05				
	LAT=	3° 31' 29.393304"	+0.000000"	3° 31' 29.393304"	0.010229m
	LON=	39° 52' 16.221957"	-0.000005"	39° 52' 16.221962"	0.010391m
	ELL HT=	26.4256m	-0.0044m	26.4212m	0.038408m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
8	RN517U				



	LAT=	3° 24' 20.132522"	+0.000000"	3° 24' 20.132522"	0.005417m
	LON=	39° 44' 39.784054"	-0.000003"	39° 44' 39.784057"	0.005528m
	ELL HT=	10.9160m	-0.0032m	10.9128m	0.033955m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
9	RN518B				
	LAT=	3° 21' 36.157122"	+0.000000"	3° 21' 36.157122"	0.012616m
	LON=	39° 49' 58.306680"	-0.000005"	39° 49' 58.306685"	0.012748m
	ELL HT=	0.8548m	-0.0044m	0.8504m	0.038814m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
10	VBASTIOES				
	LAT=	3° 17' 59.898003"	+0.000000"	3° 17' 59.898003"	FIXED
	LON=	39° 37' 35.176952"	+0.000000"	39° 37' 35.176952"	FIXED
	ELL HT=	24.6640m	+0.0000m	24.6640m	FIXED
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
11	VCHORA				
	LAT=	3° 19' 52.830869"	+0.000001"	3° 19' 52.830868"	0.032633m
	LON=	40° 04' 04.392314"	-0.000007"	40° 04' 04.392321"	0.086615m
	ELL HT=	254.7124m	-0.0043m	254.7082m	0.091635m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN



SUMMARY OF COVARIANCES
 NETWORK = MIM
 TIME = Wed Jul 18 10:26:56 2001

Definition of precision $(E \times S)^2 = C^2 + P^2$:

Horizontal:

Precision (P) expressed as: ratio
 Propagated linear error (E): U.S.
 (standard error of adjusted horizontal distance)
 Scalar (S) on propagated linear error: 1.0000
 Constant error term (C): 0.0000

3-Dimensional:

Precision (P) expressed as: ratio
 Propagated linear error (E): U.S.
 (standard error of adjusted slope distance)
 Scalar (S) on propagated linear error: 1.0000
 Constant error term (C): 0.0000
 Using orthometric height errors

FROM/ TO	AZIMUTH/ DELTA H	1.00 σ 1.00 σ	DISTANCE/ DELTA h	1.00 σ 1.00 σ	HOR PREC/ 3-D PREC
AUX01 JX02	342°32'07" -13.2510m	0.10" 0.0192m	19010.916m -***	0.0087m -***	1: 2196792 1: 2196792
AUX01 J01	260°18'11" +1.4755m	11.89" 0.0063m	147.070m -***	0.0085m -***	1: 17346 1: 17346
AUX01 J02	221°05'59" -0.0097m	50649.57" 0.0069m	0.039m -***	0.0095m -***	1: 4 -***
AUX01 J03	224°05'59" +5.5469m	0.41" 0.0056m	3684.867m -***	0.0073m -***	1: 501796 1: 501796
AUX01 J04	207°45'47" +7.4737m	0.10" 0.0028m	8578.164m -***	0.0042m -***	1: 2025583 1: 2025583
AUX01 J05	203°57'14" +5.7602m	0.21" 0.0043m	5866.956m -***	0.0060m -***	1: 979168 1: 979168
AUX01 PN17U	56°14'52" -9.7482m	0.16" 0.0213m	14080.208m -***	0.0106m -***	1: 1328787 1: 1328787
AUX01 PN518B	8°17'42" -19.8106m	0.07" 0.0036m	12996.273m -***	0.0043m -***	1: 3008722 1: 3008722
AUX01 PASTIOES	51°50'26" +4.0030m	0.08" 0.0386m	31561.141m -***	0.0119m -***	1: 2662520 1: 2662520
AUX01 PCHORA	303°28'30" +234.0471m	0.41" 0.0831m	29064.892m -***	0.0701m -***	1: 414913 1: 414913
AUX02 J01	162°58'41" +14.7265m	0.14" 0.0203m	18991.597m -***	0.0121m -***	1: 1567659 1: 1567659
AUX02 J02	162°32'19" +13.2413m	0.14" 0.0205m	19010.936m -***	0.0128m -***	1: 1481510 1: 1481510
AUX02	171°24'27"	0.12"	21016.837m	0.0114m	1: 1845004



03	+18.7979m	0.0201m	---	---	1: 1845004
UX02	176°12'03"	0.08"	25781.962m	0.0097m	1: 2651756
04	+20.7246m	0.0195m	---	---	1: 2651756
UX02	171°57'07"	0.10"	23730.097m	0.0106m	1: 2243927
05	+19.0112m	0.0197m	---	---	1: 2243927
UX02	120°38'12"	0.14"	20236.647m	0.0139m	1: 1459132
N517U	+3.5028m	0.0287m	---	---	1: 1459132
UX02	124°49'55"	0.18"	9234.757m	0.0077m	1: 1204066
N518B	-6.5596m	0.0189m	---	---	1: 1204066
UX02	87°26'28"	0.10"	30552.356m	0.0151m	1: 2019305
BASTIOES	+17.2540m	0.0432m	---	---	1: 2019305
UX02	263°31'50"	0.32"	18657.236m	0.0858m	1: 217409
CHORA	+247.2981m	0.0826m	---	---	1: 217409
01	80°18'45"	5.94"	147.040m	0.0042m	1: 34721
02	-1.4852m	0.0028m	---	---	1: 34721
01	222°42'16"	0.24"	3567.250m	0.0042m	1: 842347
03	+4.0714m	0.0028m	---	---	1: 842347
01	206°58'31"	0.18"	8489.517m	0.0073m	1: 1156246
04	+5.9982m	0.0056m	---	---	1: 1156246
01	202°44'30"	0.21"	5786.755m	0.0060m	1: 965267
05	+4.2847m	0.0046m	---	---	1: 965267
01	56°29'22"	0.09"	14214.632m	0.0064m	1: 2235847
N517U	-11.2237m	0.0203m	---	---	1: 2235847
01	8°54'34"	0.15"	13042.451m	0.0095m	1: 1371030
N518B	-21.2861m	0.0072m	---	---	1: 1371030
01	51°58'03"	0.06"	31690.512m	0.0083m	1: 3824611
BASTIOES	+2.5275m	0.0381m	---	---	1: 3824611
02	303°40'27"	0.42"	28957.808m	0.0704m	1: 411301
CHORA	+232.5716m	0.0833m	---	---	1: 411301
02	224°05'59"	0.34"	3684.828m	0.0060m	1: 615262
03	+5.5566m	0.0040m	---	---	1: 615262
02	207°45'47"	0.20"	8578.126m	0.0085m	1: 1012036
04	+7.4834m	0.0063m	---	---	1: 1012036
02	203°57'13"	0.26"	5866.919m	0.0073m	1: 799315
05	+5.7699m	0.0054m	---	---	1: 799315
02	56°14'52"	0.07"	14080.245m	0.0047m	1: 2969938
N517U	-9.7385m	0.0201m	---	---	1: 2969938
02	8°17'42"	0.17"	12996.306m	0.0104m	1: 1248106
N518B	-19.8008m	0.0078m	---	---	1: 1248106
02	51°50'26"	0.05"	31561.179m	0.0071m	1: 4431930



M03 VBASTIOES	+4.0127m	0.0380m	---	---	1: 4431930
M02 VCHORA	303°28'30" +234.0569m	0.42" 0.0834m	29064.887m ---	0.0707m ---	1: 411167 1: 411167
M03 04	196°08'54" +1.9268m	0.24" 0.0049m	5147.500m ---	0.0060m ---	1: 858291 1: 858291
M03 05	176°09'35" +0.2133m	0.32" 0.0036m	2721.551m ---	0.0042m ---	1: 641480 1: 641480
M03 RN517U	53°44'18" -15.2951m	0.09" 0.0205m	17699.553m ---	0.0076m ---	1: 2318891 1: 2318891
M03 RN518B	15°58'37" -25.3574m	0.11" 0.0067m	16129.465m ---	0.0085m ---	1: 1893153 1: 1893153
M03 VBASTIOES	51°02'04" -1.5439m	0.06" 0.0382m	35215.926m ---	0.0093m ---	1: 3785956 1: 3785956
M03 VCHORA	310°44'50" +228.5003m	0.47" 0.0833m	28615.599m ---	0.0643m ---	1: 444707 1: 444707
M05	35°54'28" -1.7135m	0.32" 0.0033m	2751.911m ---	0.0042m ---	1: 649180 1: 649180
M04 RN517U	45°32'05" -17.2219m	0.09" 0.0211m	22003.612m ---	0.0097m ---	1: 2269321 1: 2269321
M04 RN518B	16°01'09" -27.2842m	0.06" 0.0046m	21276.948m ---	0.0061m ---	1: 3516002 1: 3516002
M04 VBASTIOES	46°45'58" -3.4707m	0.06" 0.0385m	39548.101m ---	0.0111m ---	1: 3577250 1: 3577250
M04 VCHORA	319°24'00" +226.5735m	0.48" 0.0831m	31112.377m ---	0.0560m ---	1: 555474 1: 555474
M05 RN517U	46°54'01" -15.5084m	0.09" 0.0208m	19295.943m ---	0.0087m ---	1: 2212269 1: 2212269
M05 RN518B	13°09'02" -25.5708m	0.08" 0.0056m	18712.603m ---	0.0074m ---	1: 2532990 1: 2532990
M05 VBASTIOES	47°34'16" -1.7572m	0.06" 0.0384m	36849.107m ---	0.0102m ---	1: 3608103 1: 3608103
M05 VCHORA	314°22'49" +228.2870m	0.46" 0.0832m	30587.592m ---	0.0609m ---	1: 502140 1: 502140
M05 RN518B	297°07'18" -10.0623m	0.21" 0.0216m	11047.311m ---	0.0115m ---	1: 958937 1: 958937
M05 VBASTIOES	48°18'03" +13.7512m	0.07" 0.0340m	17555.940m ---	0.0053m ---	1: 3286332 1: 3286332
M05 VCHORA	282°51'19" +243.7954m	0.22" 0.0858m	36875.960m ---	0.0832m ---	1: 443279 1: 443279
M05 RN518B	73°51'26"	0.11"	23882.938m	0.0127m	1: 1881333



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BASTIOES	+23.8136m	0.0388m	-*-	-*- 1: 1881333
N518B	276°55'17"	0.26"	26310.558m	0.0844m 1: 311863
CHORA	+253.8577m	0.0830m	-*-	-*- 1: 311863
BASTIOES	265°56'34"	0.13"	49182.615m	0.0869m 1: 566214
CHORA	+230.0442m	0.0916m	-*-	-*- 1: 566214

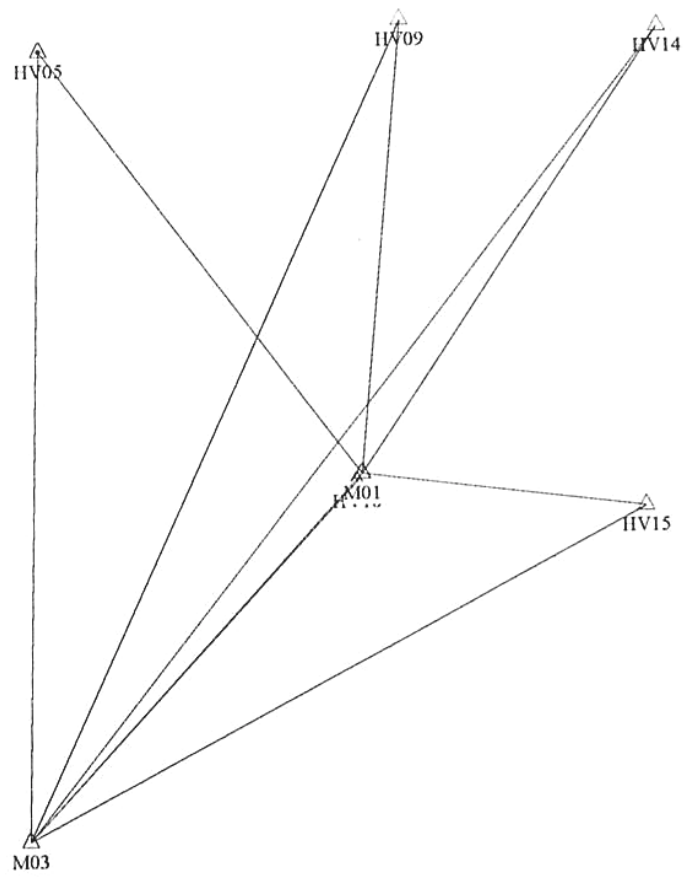


From Station Short Name	To Station Short Name	Solution Type	Slope	Ratio	Reference Variance	Entered Ant. Ht. (From)	Entered Ant. Ht. (To)
AUX01	RN518B	L1 fixed	12996.308	3.2	25.909	1.290	1.410
AUX02	RN518B	L1 fixed	9234.764	1.6	72.162	2.460	1.610
M02	M01	L1 fixed	147.048	29.0	2.692	1.290	1.410
M03	M01	L1 fixed	3567.266	9.1	18.048	1.410	1.410
M03	M05	L1 fixed	2721.562	47.0	8.422	1.410	1.420
M04	AUX01	L1 fixed	8578.199	15.8	20.147	1.410	1.290
M05	M04	L1 fixed	2751.923	13.9	6.138	1.462	1.410
RN517U	M02	L1 fixed	14080.281	3.0	78.310	2.460	1.290
VBASTIOES	M02	L1 float	31561.151		145.712	1.410	1.290
VBASTIOES	RN517U	L1 fixed	17555.990	1.7	122.946	1.410	2.460
VCHORA	AUX02	L1 float	18659.328		108.181	1.410	2.460
VCHORA	RN518B	L1 float	26312.185		160.357	1.410	1.610

***** End of Report *****



Network Map: MI188





COORDINATE ADJUSTMENT SUMMARY
 NETWORK = MI188
 TIME = Wed Jul 18 11:11:04 2001

Datum = WGS-84
 Coordinate System = Geographic
 Zone = Global

Network Adjustment Constraints:

2 fixed coordinates in y
 2 fixed coordinates in x
 2 fixed coordinates in H

POINT	NAME	OLD COORDS	ADJUST	NEW COORDS	1.00 σ
1	HV05				
	LAT=	3° 26' 55.759633"	+0.000020"	3° 26' 55.759613"	0.007014m
	LON=	39° 52' 17.987757"	+0.000003"	39° 52' 17.987754"	0.008003m
	ELL HT=	14.4754m	+0.0003m	14.4757m	0.014566m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
2	HV09				
	LAT=	3° 26' 49.479205"	+0.000017"	3° 26' 49.479188"	0.007186m
	LON=	39° 50' 53.600702"	+0.000014"	39° 50' 53.600689"	0.007825m
	ELL HT=	11.9502m	+0.0000m	11.9502m	0.002723m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
3	HV10				
	LAT=	3° 28' 37.672847"	+0.000001"	3° 28' 37.672846"	0.003734m
	LON=	39° 51' 05.023107"	+0.000002"	39° 51' 05.023106"	0.003782m
	ELL HT=	20.4708m	+0.0000m	20.4707m	0.002729m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
4	HV14				
	LAT=	3° 26' 51.956067"	+0.000010"	3° 26' 51.956058"	0.006611m
	LON=	39° 49' 53.330348"	+0.000025"	39° 49' 53.330322"	0.008099m
	ELL HT=	30.0561m	-0.0001m	30.0560m	0.007679m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
5	HV15				
	LAT=	3° 28' 44.179322"	-0.001337"	3° 28' 44.180659"	0.196292m
	LON=	39° 49' 57.519564"	-0.003180"	39° 49' 57.522744"	0.336558m
	ELL HT=	28.7325m	+0.1185m	28.8510m	0.333597m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
6	M01				
	LAT=	3° 28' 35.646326"	+0.000000"	3° 28' 35.646326"	FIXED
	LON=	39° 51' 03.741747"	+0.000000"	39° 51' 03.741747"	FIXED
	ELL HT=	22.1365m	+0.0000m	22.1365m	FIXED
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
7	M03				
	LAT=	3° 30' 00.989240"	+0.000000"	3° 30' 00.989240"	FIXED
	LON=	39° 52' 22.127686"	+0.000000"	39° 52' 22.127686"	FIXED
	ELL HT=	26.2079m	+0.0000m	26.2079m	FIXED
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN

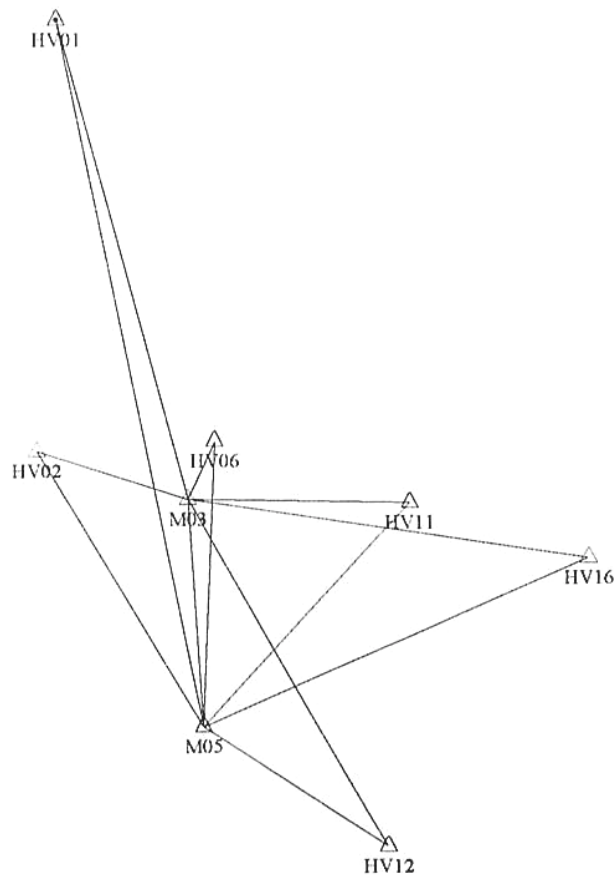


From Station Short Name	To Station Short Name	Solution Type	Slope	Ratio	Reference Variance	Entered Ant. Ht. (From)	Entered Ant. Ht. (To)
M01	HV05	L1 fixed	3829.547	4.4	13.251	1.410	2.460
M01	HV09	L1 float	3276.050		21.525	1.410	2.460
M01	HV10	L1 fixed	73.768	12.4	1.758	1.410	2.460
M01	HV14	L1 fixed	3855.847	1.6	21.843	1.410	2.460
M01	HV15	L1 float	2060.111		17.316	1.410	1.410
M03	HV05	L1 fixed	5691.032	2.0	23.741	1.410	2.460
M03	HV09	L1 fixed	6486.153	1.7	20.902	1.410	2.460
M03	HV10	L1 fixed	3494.730	3.0	33.326	1.410	2.460
M03	HV14	L1 fixed	7403.236	1.6	38.454	1.410	2.460
M03	HV15	L1 fixed	5048.648	1.7	24.133	1.410	1.410
M03	M01	L1 fixed	3567.266	9.1	18.048	1.410	1.410

***** End of Report *****



Network Map: MI190





COORDINATE ADJUSTMENT SUMMARY
 NETWORK = MI190
 TIME = Wed Jul 18 11:34:31 2001

Datum = WGS-84
 Coordinate System = Geographic
 Zone = Global

Network Adjustment Constraints:

- ~ 2 fixed coordinates in y
- ~ 2 fixed coordinates in x
- ~ 2 fixed coordinates in H

POINT	NAME	OLD COORDS	ADJUST	NEW COORDS	1.00σ
1	HV01				
	LAT=	3° 26' 53.786306"	+0.000000"	3° 26' 53.786306"	0.005350m
	LON=	39° 53' 12.924499"	-0.000001"	39° 53' 12.924500"	0.005392m
	ELL HT=	13.5022m	+0.0000m	13.5022m	0.001635m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
2	HV02				
	LAT=	3° 29' 41.951655"	+0.000000"	3° 29' 41.951655"	0.003032m
	LON=	39° 53' 20.860893"	+0.000000"	39° 53' 20.860894"	0.003029m
	ELL HT=	18.5900m	+0.0000m	18.5900m	0.001777m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
3	HV06				
	LAT=	3° 29' 38.311028"	-0.000001"	3° 29' 38.311030"	0.002939m
	LON=	39° 52' 11.697504"	+0.000000"	39° 52' 11.697504"	0.002983m
	ELL HT=	15.4282m	+0.0008m	15.4290m	0.003137m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
4	HV11				
	LAT=	3° 30' 02.550920"	+0.000000"	3° 30' 02.550919"	0.003284m
	LON=	39° 50' 56.355605"	+0.000000"	39° 50' 56.355605"	0.003398m
	ELL HT=	37.8840m	-0.0001m	37.8839m	0.003558m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
5	HV12				
	LAT=	3° 32' 16.452961"	+0.000000"	3° 32' 16.452962"	0.003442m
	LON=	39° 51' 05.197938"	+0.000002"	39° 51' 05.197937"	0.003480m
	ELL HT=	37.6229m	-0.0001m	37.6228m	0.002482m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
6	HV16				
	LAT=	3° 30' 24.225450"	+0.000001"	3° 30' 24.225449"	0.004005m
	LON=	39° 49' 46.449381"	+0.000001"	39° 49' 46.449380"	0.004008m
	ELL HT=	44.7571m	+0.0000m	44.7572m	0.002124m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
7	M03				
	LAT=	3° 30' 00.989240"	+0.000000"	3° 30' 00.989240"	FIXED
	LON=	39° 52' 22.127686"	+0.000000"	39° 52' 22.127686"	FIXED
	ELL HT=	26.2079m	+0.0000m	26.2079m	FIXED
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
8	M05				



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LAT=	3° 31' 29.393304"	+0.000000"	3° 31' 29.393304"	FIXED
LON=	39° 52' 16.221962"	+0.000000"	39° 52' 16.221962"	FIXED
ELL HT=	26.4212m	+0.0000m	26.4212m	FIXED
ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN

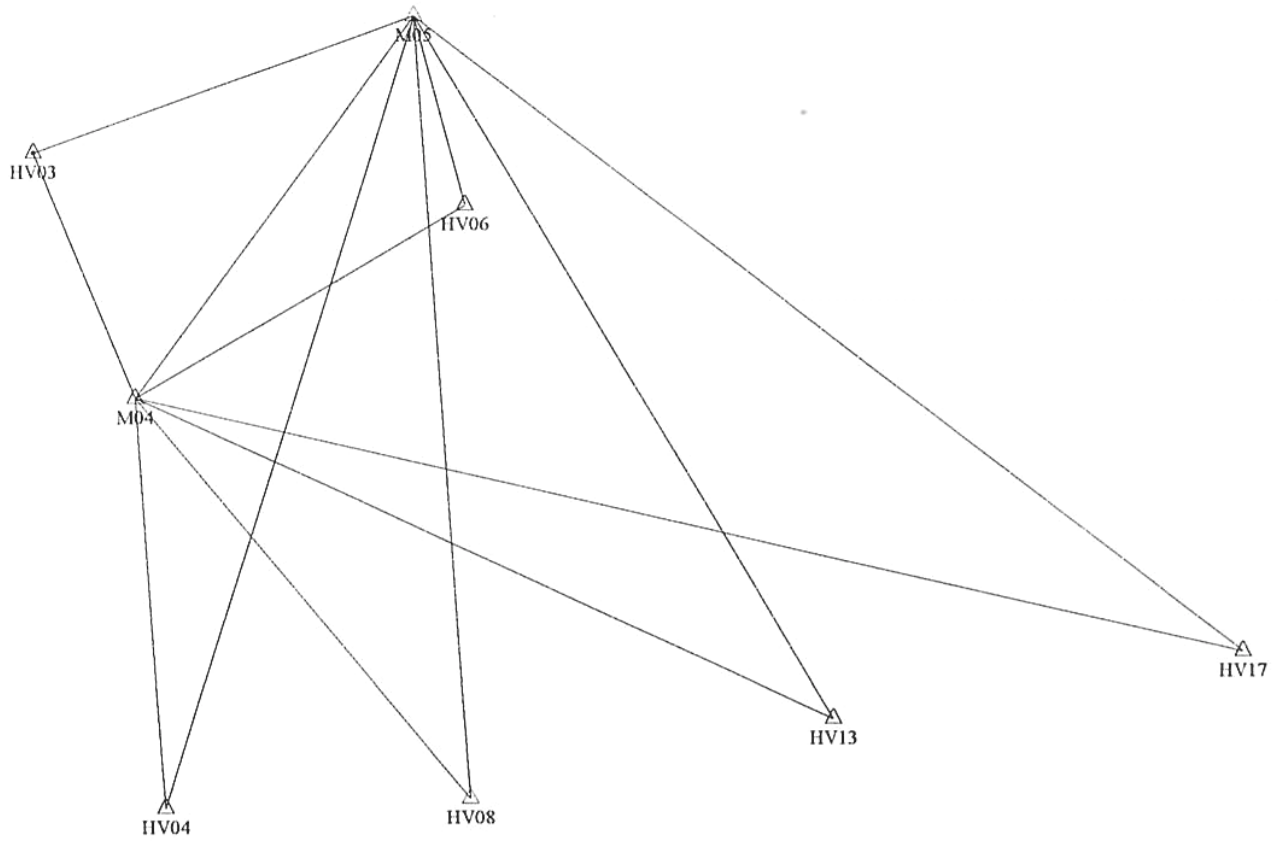


From Station Short Name	To Station Short Name	Solution Type	Slope	Ratio	Reference Variance	Entered Ant. Ht. (From)	Entered Ant. Ht. (To)
M03	HV01	L1 fixed	5960.122	5.0	9.145	1.410	2.460
M03	HV02	L1 fixed	1904.795	2.5	13.330	1.410	2.460
M03	HV06	L1 fixed	767.459	6.9	8.213	1.410	2.460
M03	HV11	L1 fixed	2647.811	2.8	10.394	1.410	2.460
M03	HV12	L1 fixed	4790.767	25.1	9.419	1.410	2.460
M03	HV16	L1 fixed	4857.743	14.7	7.157	1.410	1.410
M03	M05	L1 fixed	2721.562	47.0	8.422	1.410	1.420
M05	HV01	L1 fixed	8644.663	3.9	13.238	1.420	2.460
M05	HV02	L1 fixed	3856.390	3.2	12.123	1.420	2.460
M05	HV06	L1 fixed	3414.917	4.9	12.572	1.420	2.460
M05	HV11	L1 fixed	3632.084	3.4	10.027	1.420	2.460
M05	HV12	L1 fixed	2625.798	80.3	4.989	1.420	2.460
M05	HV16	L1 fixed	5037.476	19.2	8.973	1.420	1.410

***** End of Report *****



Network Map: MI191





COORDINATE ADJUSTMENT SUMMARY
 NETWORK = MI191
 TIME = Wed Jul 18 14:34:34 2001

datum = WGS-84
 coordinate System = Geographic
 zone = Global

Network Adjustment Constraints:

2 fixed coordinates in y
 2 fixed coordinates in x
 2 fixed coordinates in H

POINT	NAME	OLD COORDS	ADJUST	NEW COORDS	1.00σ
1	HV03				
	LAT=	3° 31' 55.215263"	+0.000000"	3° 31' 55.215262"	0.002712m
	LON=	39° 53' 27.852037"	-0.000001"	39° 53' 27.852037"	0.002725m
	ELL HT=	26.6999m	+0.0000m	26.6998m	0.002513m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
2	HV04				
	LAT=	3° 34' 00.100059"	+0.000001"	3° 34' 00.100058"	0.003549m
	LON=	39° 53' 02.891954"	+0.000000"	39° 53' 02.891954"	0.003560m
	ELL HT=	34.7544m	-0.0001m	34.7543m	0.003654m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
3	HV06				
	LAT=	3° 32' 05.304537"	+0.000002"	3° 32' 05.304535"	0.002777m
	LON=	39° 52' 06.534042"	+0.000003"	39° 52' 06.534040"	0.002960m
	ELL HT=	22.2155m	+0.0000m	22.2155m	0.004191m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
4	HV08				
	LAT=	3° 33' 58.147910"	-0.000001"	3° 33' 58.147912"	0.003607m
	LON=	39° 52' 05.564751"	+0.000000"	39° 52' 05.564750"	0.003608m
	ELL HT=	42.2720m	+0.0003m	42.2722m	0.003398m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
5	HV13				
	LAT=	3° 33' 42.936556"	-0.000001"	3° 33' 42.936556"	0.003969m
	LON=	39° 50' 56.847712"	-0.000001"	39° 50' 56.847712"	0.003977m
	ELL HT=	43.7232m	+0.0002m	43.7234m	0.002816m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
5	HV17				
	LAT=	3° 33' 30.304410"	-0.000001"	3° 33' 30.304411"	0.004947m
	LON=	39° 49' 39.598663"	+0.000001"	39° 49' 39.598663"	0.005027m
	ELL HT=	57.3362m	+0.0000m	57.3362m	0.004664m
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
6	M04				
	LAT=	3° 32' 41.959391"	+0.000000"	3° 32' 41.959391"	FIXED
	LON=	39° 53' 08.514144"	+0.000000"	39° 53' 08.514144"	FIXED
	ELL HT=	28.1347m	+0.0000m	28.1347m	FIXED
	ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN
7	M05				



MONTGOMERY WATSON



LAT=	3° 31' 29.393304"	+0.000000"	3° 31' 29.393304"	FIXED
LON=	39° 52' 16.221962"	+0.000000"	39° 52' 16.221962"	FIXED
ELL HT=	26.4212m	+0.0000m	26.4212m	FIXED
ORTHO HT=	0.0000m	+0.0000m	0.0000m	NOT KNOWN



From Station Short Name	To Station Short Name	Solution Type	Slope	Ratio	Reference Variance	Entered Ant. Ht. (From)	Entered Ant. Ht. (To)
M04	HV03	L1 fixed	1554.916	12.7	3.768	1.410	1.410
M04	HV04	L1 fixed	2406.477	7.7	5.926	1.410	2.260
M04	HV06	L1 fixed	2219.686	22.3	1.916	1.410	2.460
M04	HV08	L1 fixed	3041.621	2.9	17.430	1.410	2.460
M04	HV13	L1 fixed	4474.551	6.1	8.918	1.410	2.460
M04	HV17	L1 fixed	6616.674	2.0	15.946	1.410	2.460
M05	HV03	L1 fixed	2348.764	11.5	4.190	1.462	1.410
M05	HV04	L1 fixed	4848.092	6.3	8.098	1.462	2.260
M05	HV06	L1 fixed	1142.880	40.7	1.222	1.462	2.460
M05	HV08	L1 fixed	4581.060	2.1	23.958	1.462	2.460
M05	HV13	L1 fixed	4777.851	3.8	12.754	1.462	2.460
M05	HV17	L1 fixed	6096.040	1.9	13.393	1.462	2.460
M05	M04	L1 fixed	2751.923	13.9	6.138	1.462	1.410

***** End of Report *****



Geométrico ✓
Trigonométrico
aqueométrico

Cliente: ENGELOFT, ENGENHARIA e CONSULTORIA LTDA Folha: 01
Local: MISSI / CE Obra: 0-739

Estacas	Desnível		Desnível Médio	Comp.	Desnível Compens.	Atitudes	Estacas
	Ida	Volta					
RN57U (JBSG)						44,0117	
PS01	+15,604			+0,0020	+15,6060	59,6177	1.416,54
PS02	-2,227			+0,0040	-2,2230	57,3947	2.836,84
PS03	+1,054			+0,0028	+1,0568	58,4515	2.023,68
PS04	+3,103			+0,0045	+3,1075	61,5590	3.242,34
PS05A	-0,543			+0,0029	-0,5401	61,0189	2.109,20
PS06	+7,833			+0,0030	+7,8360	68,8549	2.127,23
PS07	+0,442			+0,0035	+0,4455	69,3004	2.513,57
PS08	+13,772			+0,0035	+13,7755	83,0759	2.475,93
PS09	-15,617			+0,0032	-15,6138	67,4621	2.289,39
PS10	-8,761			+0,0029	-8,7581	58,7040	2.052,64
PS11	+0,854			+0,0033	+0,8573	59,5613	2.366,74
M05	+0,610			+0,0000	+0,6100	60,1713	16,03
PS12	+0,423			+0,0000	+0,4230	60,5943	26,93
PS13	-3,683			+0,0035	-3,6795	56,9148	2.495,30
PS14	+5,036			+0,0013	+5,0373	61,9521	966,78
M04	+0,017			+0,0000	+0,0170	61,9691	21,88
PS15	+0,128			+0,0000	+0,1280	62,0971	16,76
PS16	-5,176			+0,0014	-5,1746	56,9225	981,49
PS17	-5,939			+0,0030	-5,9360	50,9865	2.155,82
PS18	+1,383			+0,0033	+1,3863	52,3728	2.344,33
M03	+7,462			+0,0006	+7,4626	59,8354	451,26
PS19	-7,383			+0,0033	-7,3797	52,4557	2.406,47
PS20	-7,501			+0,0033	-7,4977	44,9580	2.341,95
M01	+10,756			+0,0011	+10,7571	55,7151	817,73
M02	-1,492			+0,0002	-1,4918	54,2233	150,08
PS21	+1,548			+0,0002	+1,5482	55,7715	158,66
PS22	-13,294			+0,0027	-13,2913	42,4802	1.945,02
PS23	-1,256			+0,0015	-1,2545	41,2257	1.049,42
PS24	+1,659			+0,0006	+1,6596	42,8853	435,15
PS25	-4,581			+0,0022	-4,5788	38,3065	1.594,35
PS26	+5,819			+0,0021	+5,8211	44,1276	1.524,02
PS27	-4,125			+0,0027	-4,1223	40,0053	1.926,70
PS28	-1,934			+0,0019	-1,9321	38,0732	1.376,36

Calculado por: _____

Verificado por: _____

Data: ___/___/___



Geométrico							
Trigonométrico							
Barométrico							
Cliente: <u>ENGESOFT ENGENHARIA E CONSULTORIA LTDA</u>					Folha: <u>02</u>		
Local: <u>MISSI/CE</u>					Obra: <u>0-739</u>		
Estacas	Desnível		Desnível Médio	Comp.	Desnível Compens.	Atitudes	Estacas
	Ida	Volta					
<u>RS28</u>							
<u>RS29</u>	<u>-0,958</u>			<u>+0,0021</u>	<u>-0,9559</u>	<u>37,1173</u>	<u>1.495,88</u>
<u>RS30</u>	<u>-7,138</u>			<u>+0,0029</u>	<u>-7,1351</u>	<u>29,9822</u>	<u>2.044,19</u>
<u>RS31</u>	<u>+0,434</u>			<u>+0,0007</u>	<u>+0,4347</u>	<u>30,4169</u>	<u>472,16</u>
<u>RN518B</u>	<u>+3,836</u>			<u>+0,0015</u>	<u>+3,8375</u>	<u>34,2544</u>	<u>1.064,86</u>
<u>(BGE)</u>	<u>∑Ida = -9,825</u>	<u>∑Volta = -0,0777m</u>		<u>P = 10 mm</u>		<u>∑At = -9,7573</u>	<u>D = 55.733,73m</u>
						<u>9,2575</u>	

Calculado por: _____ Verificado por: _____ Data: ____ / ____ / ____

Consórcio



MONTGOMERY WATSON

