WUHAN COLOCATION SURVEY

Reports and results

Surveyed on December 2003

Reported on January 2005

LAREG

Service de géodésie et de Nivellement \ Travaux Spéciaux

Table

Introduction

The ITRF is the result of a combination of the different terrestrial reference frames provided by the four space geodetic techniques GPS, VLBI, SLR and DORIS. To perform this combination between independent reference frames, it is necessary to have some co-location sites where the various techniques are observing and whose ties have been surveyed in three dimensions. Many co-location sites have been identified and some of them have missing or inconsistent ties. Furthermore, new instruments may be installed or replaced on these sites. Then, the ties with the existent techniques on the site have to be determined.

In this frame, Wuhan Jiufeng co-location site (China) becomes an interesting site. Indeed, on this site where two techniques were currently observing (GPS and SLR), a new technique, DORIS, was installed during the survey. The tie between the SLR and the GPS was missing and the ties with the new DORIS station had to be determined.

This report briefly presents the local ties survey of Wuhan Jiufeng site that took place in December 2003, from the observations on site to the computation of the SINEX file.

1. Co-location site description

The Wuhan Jiufeng co-location site is located in the Hubei province, China.

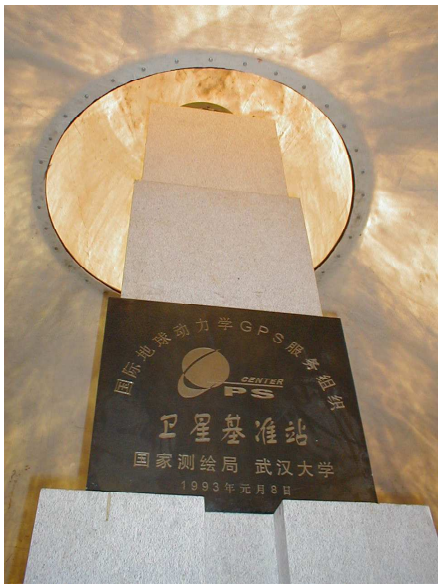
This co-location site can be divided into two subsites about 13 km apart.

One subsite is located in Wuhan and depends on Wuhan University. Here is the IGS GPS station called WUHN. The other subsite is located in Jiufeng, in Wuhan Eastern surbub. On this site, one can find the SLR telescope and the DORIS station. Furthermore, two other GPS stations (EGNOS, JAVAD) are installed on the site.

1.1. ITRF space geodetic techniques

1.1.1. WUHN IGS GPS station

DOMES NUMBER : 21602M001



Choke Ring antenna under its dome

WUHN groundmark

This station refers to a ground mark that has not been re-surveyed. The antenna height used for the ties computations is the one given in the IGS site log (cf Annex 5.1.).

1.1.2. SLR station

DOMES NUMBER : 21602S004

Global view of the telescope

Building hosting the SLR telescope

The SLR measurements refer to a point in the telescope optics where the two rotation axes intersect. This reference point can not be materialized. There is no groundmark that refers to the telescope as it is described in the site log (cf Annex 5.2.).

1.1.3. JIUB DORIS station

DOMES NUMBER : 21602S005
DOMES NUMBER : 21602M005

DORIS antenna on its pier

This station has been installed during the campain and is called JIUB. The pier had been built by the Institute of Geodesy and Geophysics. The antenna support is a plate in aluminium that has been levelled. A ground mark is set up on the top of the pillar so that the height of the reference point (400 Mhz phase centre) is 0.485 m.

JIUB reference point DOMES number is 21602S005 and DORIS groundmark DOMES number is 21602M005.

The site log is presented in Annex 5.4. Description elements are presented in Annex 5.5.

1.2. Other instruments

1.2.1. WHJF GPS station

DOMES NUMBER : 21602M003

WHJF GPS station antenna

This GPS station is a permanent station, recording daily observations. The data are recorded on a PC where software lets the RINEX files be computed and exported.
The antenna is a JPSREGANT_DD_E type. It's set up on an adaptator on a pier. The reference point is at the top and centre of the adaptator.
This adaptator is described in Annex 5.6.

1.2.2. EGNOS GPS station

DOMES NUMBER : 21602M002

Choke Ring antenna of EGNOS GPS station

This EGNOS station is also a permanent GPS station, providing daily observations. The data are recorded on a PC where software lets the RINEX files be computed and exported.
The antenna is a dual frequency NOVATEL choke ring Model 503 with radome. The technical description of the antenna is in Annex 5.7. The antenna is set up on a metallic support on top of a concrete pier. The EGNOS reference point is located at the top and centre of the metallic support.

2. Survey description

2.1. Organization

The local ties survey of Wuhan Jiufeng co-location site has been led by Institut Géographique National (IGN).

The French survey team (2nd, 3rd and 5th persons from the left) and the Chinese cooperators

The survey team gathered 3 members : Valérie Michel, Stéphane Kaloustian from the Special Works unit of IGN, which mainly deals with micro-geodesy and metrology ; and Pierre Vergez from the Global Networks department of IGN which takes part in DORIS network maintenance. A fourth person from IGN, Bruno Garayt, took part in the processing.
Also, this project took many benefits of support from the Institute of Geodesy and Geophysics and the Institute of Seismology which host respectively the DORIS station and the SLR.

The survey took place from December, the 6th to December, the 12th 2003. The meteorological conditions were stable during the survey (clouds and rain). That was particularly unconvenient for the GPS observations on the SLR since this instrument has to be protected from rain. No astronomic

observations were planned during the survey so that there were no other constraint on the survey planning than the meteorological conditions.

2.2. Equipment

All the topometric survey instruments and equipments belong to IGN and had been temporarily imported for the needs of the survey.

2.2.1. Instruments

Leica theodolites and total stations (T3000, TC2002 and TDA5005) were used. Those instruments, which are regularly calibrated at IGN's calibration unit, have a standard deviation of 0.15 mgon about angles and 1 mm + 1 ppm about distances. Two Leica accurate corner cube reflectors (GPHP1P), which are calibrated with the tacheometers, were used to determine distances.
For the altimetric observations, an electronic level (Leica NA3003) and invar bar code levelling rods were used. This equipment, regularly calibrated at IGN's calibration unit, has a resolution of 0.01 mm.
For the GPS observations, Leica SR530 receivers with Leica AT504 choke ring antennas were used. Antennas are also calibrated.
All these instruments allowed the observations to be recorded electronically on PCMCIA cards or REC modules and are then downloaded to laptop PC for processing.

2.2.2. Equipment and accessories

Several very useful accessories have been also brought for this type of fieldworks. These accessories included such items as :

- § heavy tripods, in order to ensure the stability of temporary stations ;
- § translation stage in order to center a target on a rotation axis ;
- § 0.5 m, 1.8 m and 3.0 m long Invar staffs that are all calibrated and associated to each other ;
- § calibrated trefoils targets, prisms ;
- § trivet plates and tribrachs regularly calibrated.

Equipment for construction was also used.

2.3. Wuhan Jiufeng observations polygon

2.3.1. Strategy

All the survey was conducted in order to provide the highest accuracy in the determination of the 3D vectors between the observing instruments. This survey encountered many difficulties so that the strategy has been to mix GPS and topometric observations.

The first difficulty is that the 2 subsites are 13 km apart. Therefore, the only way to tie the two subsites to each other with enough precision is GPS observations during long sessions (many days). On the first site, WUHN IGS GPS station records daily observations. On the other site, two GPS stations (WHJB, EGNOS) record also daily data. The idea was to use these data in addition to on site GPS observtaions, to compute the tie between these two subsites.

As far as the SLR is concerned, the difficulty lies on the fact that it is installed at the top of a rather high building over the land, in a very narrow room, and the dome allows a restricted visibility. Therefore, no topometric observation could be led. Furthermore GPS observations require the dome to be open, which the weather could not allow for long sessions. Therefore, the observed baseline should be short. Then, the reference point can not be materialized and the GPS observations have to be expressed with respect to this reference point.

Therefore a ground control network polygon was set up on Jiufeng subsite. This includes 4 temporary points (3 heavy tripods and one platform on the roof), the DORIS pier, and the 2 GPS antennas which have been intersected (the EGNOS GPS antenna and the WHJF GPS antenna). It has been observed by high precision topometry in order to ensure the best accuracy in the link between DORIS, EGNOS and WHJF.
Then, for the global network, the SLR telescope and the IGS station WUHN are integrated.

2.3.2. Observations

2.3.2.1.DORIS installation

The installation has been led by Pierre Vergez, who controlled the verticality of the antenna and the alignment with the ground mark on the top of the pier. DORIS reference mark has been included in the polygon and observed by GPS as a secondary determination.
Annex 5.5. shows some elements.

2.3.2.2.SLR reference point

The reference point has been determined in two successive steps : the first one to materialize its horizontal position, the second one to measure the vertical eccentricity between the reference point and the horizontal plane.

In a first step, the SLR vertical rotation axis was determined. It has been materialized by setting up a plaform on its top. The centre of the platform should be invariant by any telescope horizontal movements.
The platform is actually a translation stage. Once the telescope pointing at a zenith angle of 90°, a target on the translation stage was sighted from one total station set up on a tripod and the direction recorded. The SLR has been rotated 180° around the vertical axis, and the same target sighted again. Then the translation stage was adjusted of half the difference of the two directions. The same thing was done with the SLR telescope oriented at a direction of 90° from the original position. This operation was repeated until the target doesn't move anymore when sighted with the total station, regardless the direction the SLR is pointing. The platform is therefore on the vertical rotation axis.

Then, the offset from the platform on the top of the SLR to the intersection point has to be determined.
Because of the too narrow room around the telescope and the high position above the floor, it was not possible to use direct levelling though it would have been the more precise way to determine this offset. Therefore, this has been done by indirect levelling using a corner cube on the horizontal axis and on the platform. This operation has been repeated by putting the prism above the horizontal

axis, below the horizontal axis and by measuring the diameter of the mechanical axis for each extremity. The resulting offset is 0.5372 m with a precision of ±0.5 mm.
Annex 5.3. shows some elements.

2.3.2.3.Ground network principles

All the visible lines of sights have been observed with the tacheometers described in 1.3.1. The ground network is presented in figure 1.
Horizontal directions and zenith distances were observed in sets, with each set consisting of one reading in both direct and reverse telescope positions. Any observed angle was rejected if the difference between the two circles was greater than 1mgon. Distance measurements were observed over each line one time in both direct and reverse positions. Meteorological data (atmospheric pressure and temperature) were recorded at the beginning of each station.

The temporary points (the 3 heavy tripods or the platform on the roof) are equiped with forced-centring devices. The heights (tacheometers, trefoils, prisms, even GPS antenna) refer to the top and the centre of these centring devices. On each tripod, two different total stations have been set up and two different operators observed, in order to avoid any systematic effect. Heights and levelling were controlled before and after each set up.

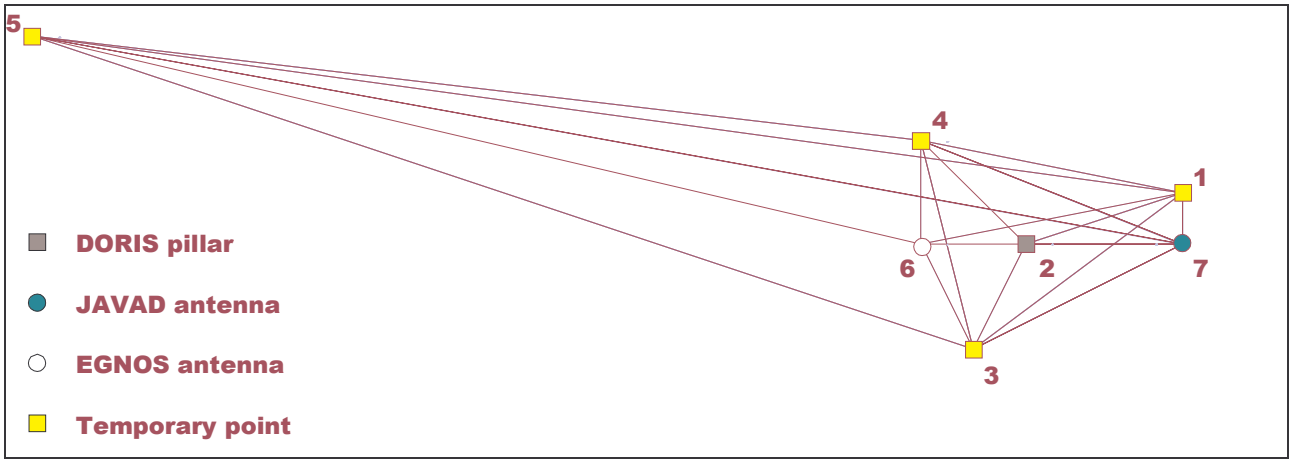


fig.1. Ground network

As far as direct levelling is concerned, a forward run and a backward run were observed between each benchmark. Before each workday, the instrument collimation was checked. The electronic level instrument was set to perform two readings on bar code rod, and that measurement was rejected if the difference between the two readings was greater than 0.04 mm. In the same way, if the difference between the two runs was greater than 0.1 mm√n, where n is the number of traverse legs, a third run was completed.
Nine interesting points are included in the direct levelling network as shown in figure 2. : the top of WHJF antenna, SLR horizontal axis, DORIS pier, the 4 temporary points and 2 levelling benchmarks (one set up on SLR building, one set up at the basis of EGNOS pier).

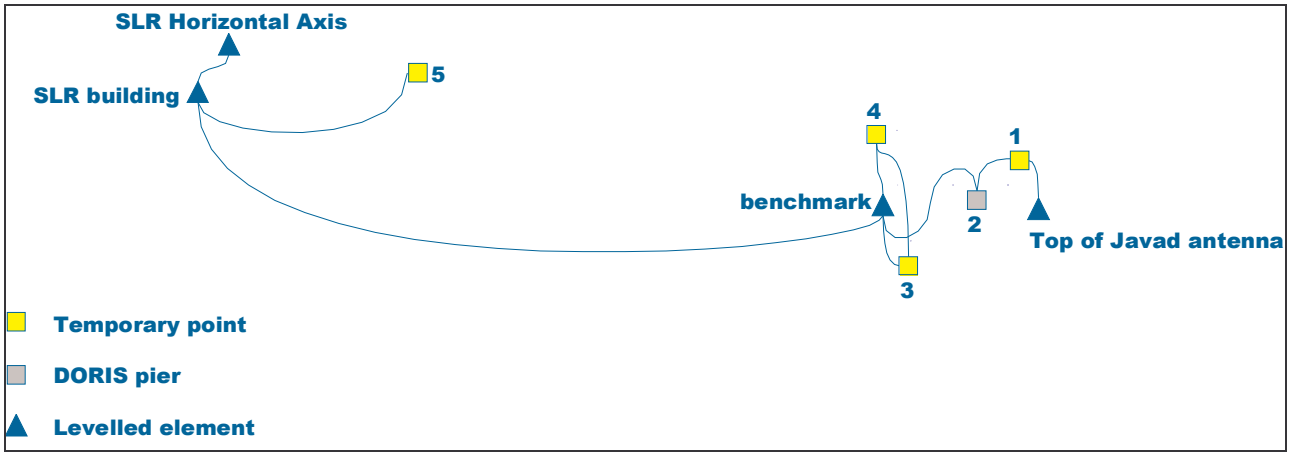


fig.2. Direct levelling network

2.3.2.4.GPS antenna intersections

For WHJF GPS antenna and EGNOS GPS antenna, the same procedure has been followed since the antennas could not be removed : the reference point had to be determined indirectly.

As far as the planimetric position is concerned, from each station pointing at the antennas, both right side and left side of an element theoretically centered on the phase center of the antenna have been observed. This element has been chosen so that it is well defined for the operator : the antenna support for WHJF antenna and the choke ring of EGNOS antenna.

Then, as far as the altimetric position is concerned, the zenithal angles have been measured on a well defined element from which the antenna or support quotations let the difference in altitude be deduced. That's why the zenithal angles have been measured on a defined element of the support for Javad antenna and on the top of the dome for EGNOS antenna.
Annexs 5.6. and 5.7. shows some elements of WHJF antenna and EGNOS antenna.

2.3.2.5.GPS observations

The GPS observations of WUHN, EGNOS and WHJF permanent stations have been used during all the survey, from DOY 341 (December, 7th) to DOY 346 (December, 12th).
The GPS observations for the DORIS and the SLR stations, and the temporary stations (points 1 and 5), were carried out during the survey with LEIAT504 GPS antennas and the following specifications :

- Cutoff angle 10°
- Data recording rate 30 s

The following table presents the different sessions :

Point	Start (UT)		End (UT)		Ant. Height (m)	Ant. Type
DORIS plate	DOY 342	08:03	DOY 343	01:46	N,E 0.000 Up 0.0150	LEIAT504 (IGS standards)
SLR platform	DOY 345	01:06	DOY 346	01:58	N,E 0.0000 Up 0.0000	
1 (top and centre of platform)	DOY 341 DOY 342 DOY 343 DOY 344 DOY 344	07:55 02:13 01:46 08:25 09:48	DOY 342 DOY 343 DOY 344 DOY 344 DOY 346	02:06 01:40 02:03 09:44 02:16	N,E 0.0000 Up 0.1902	
5 (top and centre of heavy tripod)	DOY 341 DOY 343 DOY 344 DOY 345	09:36 01:59 10:00 02:26	DOY 343 DOY 344 DOY 345 DOY 346	01:55 02:00 01:54 02:07	N,E 0.0000 Up 0.1872	

All the antenna heights are related to the GPS antenna reference point. They were measured with a 1 mm precision.

3. Computations

3.1. On-site validation

3.1.1. Ground control network

The control network in Jiufeng has been pre-processed on site in order to point out any problems consequently to observations. The observations have been checked in a local coordinate system by a 3D Least Squares Adjustment with the software COMP3D developed at IGN by Y. EGELS.
The blunders have been detected and the precision has been estimated in order to check if the requirements of such a survey were achieved.

The a priori standard deviations for the different observations from tacheometers are :

- 0.5 mgon for horizontal angles,
- 0.8 mgon for vertical angles,
- 1 mm + 1 ppm for distances,

The levelling network has been also validated on site by adjustments between 2 successive benchmarks, and finally by a global adjustment.

The global adjustment of all these observations gives in a local topocentric network with an arbitrary orientation the following coordinates and their confidence ellipsoids at 1σ. The ellipsoids are described by their 3 semi-axes and their orientaion in space (bearing and site).

Point	planimetric definition	altimetric definition	x (m)	y (m)	h (m)
1	center of the platform	top of the platform	1000.0000	1000.0000	71.2239
2	DORIS planimetric center	top of the support, basis of the antenna	988.3764	996.0570	70.0704
3	center of the platform	top of the platform	980.8171	989.2695	69.7058
4	center of the platform	top of the platform	976.1583	999.9372	69.8740
5	center of the platform	top of the platform	879.6324	1000.0000	74.7810
6	planimetric center of the antenna	top of the dome	976.3574	996.3779	71.7893
7	planimetric center of the antenna	basis of the antenna, top of the support	1000.4870	998.5074	71.5660
9	---	horizontal axis	---	---	87.0471

Point	Semi-axis (mm)	Bearing (gon)	Site (gon)
1	0.1	378.9112	-0.0002
	0.1	78.9116	0.0005
	0.1	296.3594	99.9992
2	0.3	79.3218	0.3452
	0.2	379.3221	-0.0841
	0.1	294.5134	99.6447
3	0.4	71.2311	0.8074
	0.2	371.2343	-0.2563
	0.1	290.7767	99.1530
4	0.4	99.2987	0.6361
	0.2	399.3069	-0.8364
	0.1	357.9000	98.9495

Point	Semi-axis (mm)	Bearing (gon)	Site (gon)
5	0.5	99.8948	0.0619
	0.2	294.0971	99.9378
	0.1	399.8948	0.0055
6	0.4	91.6508	-2.4613
	0.2	391.6629	0.3143
	0.2	99.7520	97.5187
7	0.2	379.7827	-4.4689
	0.2	380.7883	95.5308
	0.1	79.7876	-0.0705

3.1.2. GPS

The GPS baselines have been processed on site to check the ambiguities resolution.

3.2. GPS network

The GPS baselines have been processed with BERNESE software version 4.2.
The antenna excentricity from the WUHN logsheet was used to get the station reference point position.

The main features of the adopted processing strategy are presented in the followig table :

Measurement models	• DE200 planetary ephemeris model • Earth potential model : JGM3 • Ground antenna : IGS/NGS elevation-dependent phase center models (cf annex 5.6) • Solid Earth tides applied (IERS Conventions 96) • Orbits and ERPs : IGS final products
Processing parameters	• Elevation dependant weighting • Elevation cutoff angle : 10 degrees • Troposphere model : Saastamoinen

Estimated parameters :	• Adjustment : Weighted least-squares algorithms • Ambiguity resolution : different strategies according to the lenth of the baselines – QIF strategy – SIGMA strategy • Solved ambiguities introduced to daily solutions • Daily final solutions : different strategies according to the length of the baselines – L1 solution for short baselines at the Jiufeng subsite – Ionosphere free solutions for Wuhan – Jiufeng connexion • Constrained solutions (no stations fixed) • No troposphere zenith delays estimation

Daily solutions were produced and correlations correctly modelled. The corresponding NEQs were combined using ADDNEQ program providing a full covariance matrix given in annex 5.8.

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--------------------------------------------------------------------------------------------
 COMPARISON OF STATION COORDINATES WITH RESPECT TO THE COMBINED SOLUTION IN MM
 - UNWEIGHTED RMS OF INDIVIDUAL COORDINATE RESIDUALS
--------------------------------------------------------------------------------------------
 TOTAL NUMBER OF STATIONS:     7
--------------------------------------------------------------------------------------------
 NUM  STATION         #FIL C   RMS     1     2     3     4     5     6     7
--------------------------------------------------------------------------------------------

   5  30               7  N    1.0    -.6    .1    .3   -.4  -2.3   -.6    .4
                         E    1.0    -.3  -1.0   -.5   2.0   -.1    .7   -.2
                         U    1.7     .0    .4    .6    .7  -2.3   2.6  -2.2

   4  40               8  N    1.3    -.3    .3    .2   -.6  -2.6   -.6    .9   1.8
                         E    1.0    -.5  -1.2   -.5   2.0    .0    .7   -.2   1.0
                         U    2.5    -.4  -1.1   -.3   1.7  -2.3   3.1    .3   4.7

   2  5                8  N     .1    -.1   -.1   -.1   -.1   -.1   -.1   -.1   -.1
                         E     .0     .0    .0    .0    .0    .0    .0    .0   -.1
                         U     .0     .0    .0    .0    .0    .0    .0    .0    .0

   6  1                4  N     .7    -.7          .5   -.6   -.4
                         E     .5     .3          .2    .9   -.1
                         U    1.5    -.9         -.6   1.7   1.6

   7  2                2  N    1.4                     -1.3   -.4
                         E    1.5                      1.5   -.1
                         U     .9                      -.2    .8

   3  20               1  N     .0                                 -.4
                         E     .0                                  .5
                         U     .0                                1.8

   8  35               1  N     .0                                       .9
                         E     .0                                     -.2
                         U     .0                                      .3

  10  4                2  N     .4                                       .2    .4
                         E     .4                                     -.3    .2
                         U     .7                                     -.6    .3

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For this solution, the survey control point 5 has been heavily constrained (0.1 mm) to its ITRF2000 coordinates at epoch 2003:342.

3.3. Jiufeng network

The analysis of Jiufeng network observations has been carried out with Microsearch Geolab software. The input files were developped from :

- § all the topometric observations : distances, horizontal and zenithal angles, direct levelling, planimetric and altimetric centerings.
- § an extracted covariance matrix of the GPS baselines with point 1, 5 and the SLR. This defines the local datum (origin and orientation)

This adjustment gives us coordinates and covariance matrix of all the points of Jiufeng network, except the planimetric position of the SLR which is given by the GPS covariance matrix.

The following station name translation table has been used for the computation :

Point description	Used name or code	Computation name
SHAO IGS reference point	21605M	21605M (GPS and topometry) *Rem : SHAO for GPS observations*
EGNOS station: • base and axis of the screw (reference point) • top and axis of the antenna dome		21605M (GPS and topometry) *Rem : EGNO for GPS observations* (topometry)
SLR station : • System Reference Point (SRP) • Top and axis of the translation stage (telescope vertical rotation axis)	21605S	21605S (GPS and topometry))
New SLR station control point • base and axis of the screww		

The results for the points of interest are :

Adjusted XYZ Coordinates:

CODE	FFF	STATION	X-COORDINATE STD DEV	Y-COORDINATE STD DEV	Z-COORDINATE STD DEV		
XYZ		01	-2279849.9138 0.0009	5004695.8814 0.0014	3219778.8948 0.0010	m	0
XYZ		02	-2279839.2834 0.0009	5004701.2811 0.0014	3219775.7628 0.0010	m	0
XYZ		05	-2279739.9102 0.0009	5004743.7341 0.0014	3219789.3838 0.0010	m	0
XYZ		09	-2279714.5731 0.0009	5004767.8069 0.0015	3219794.2113 0.0010	m	0
XYZ		21602M002	-2279828.6185 0.0009	5004706.6944 0.0014	3219777.5997 0.0010	m	0
XYZ		21602M005	-2279839.2495 0.0009	5004701.2066 0.0015	3219775.7145 0.0010	m	0
XYZ		21602S004	-2279714.3814 0.0009	5004767.3860 0.0014	3219793.9387 0.0010	m	0
XYZ		21602S005	-2279839.4231 0.0009	5004701.5876 0.0015	3219775.9613 0.0010	m	0
XYZ		WHJF	-2279850.6855 0.0009	5004696.7062 0.0014	3219777.7521 0.0010	m	0

2-D and 1-D Relative Station Confidence Regions (95.000 and 95.000 percent):

FROM	TO	MAJ-SEMI	AZ	MIN-SEMI	VERTICAL	DISTANCE	PPM
01	02	0.0008	76	0.0003	0.0001	12.3276	66.28
01	05	0.0007	179	0.0006	0.0005	120.4188	5.52
01	09	0.0011	147	0.0010	0.0011	154.0291	6.92
01	21602M002	0.0010	88	0.0006	0.0007	23.9184	42.09
01	21602M005	0.0009	76	0.0004	0.0011	12.3369	69.59
01	21602S004	0.0011	147	0.0010	0.0007	153.9749	7.13
01	21602S005	0.0009	76	0.0004	0.0011	12.2972	69.82
01	WHJF	0.0005	166	0.0002	0.0003	1.6068	302.86
02	05	0.0009	69	0.0007	0.0005	108.9166	8.45
02	09	0.0013	81	0.0011	0.0011	142.5437	8.84
02	21602M002	0.0008	94	0.0006	0.0007	12.1004	62.84
02	21602M005	0.0003	0	0.0003	0.0011	0.0950	2772.36
02	21602S004	0.0013	81	0.0011	0.0007	142.4807	9.03
02	21602S005	0.0003	0	0.0003	0.0011	0.3910	673.59
02	WHJF	0.0008	86	0.0005	0.0003	12.4457	66.35
05	09	0.0011	148	0.0010	0.0010	35.2814	30.41
05	21602M002	0.0010	86	0.0008	0.0008	96.8502	10.62
05	21602M005	0.0010	69	0.0007	0.0011	108.9207	8.79
05	21602S004	0.0011	148	0.0010	0.0006	35.0982	31.48
05	21602S005	0.0010	69	0.0007	0.0011	108.9004	8.79
05	WHJF	0.0008	170	0.0006	0.0005	120.9053	6.83
09	21602M002	0.0014	94	0.0012	0.0012	130.4493	10.57
09	21602M005	0.0013	81	0.0011	0.0015	142.5550	9.03
09	21602S004	0.0003	0	0.0003	0.0009	0.5368	490.62
09	21602S005	0.0013	81	0.0011	0.0015	142.4976	9.03
09	WHJF	0.0012	158	0.0010	0.0011	154.4435	7.57
21602M002	21602M005	0.0008	94	0.0006	0.0013	12.1115	66.44
21602M002	21602S004	0.0014	94	0.0012	0.0009	130.3861	10.76
21602M002	21602S005	0.0008	94	0.0006	0.0013	12.0625	66.71
21602M002	WHJF	0.0010	98	0.0007	0.0007	24.2228	43.01
21602M005	21602S004	0.0013	81	0.0012	0.0012	142.4917	9.22
21602M005	21602S005	0.0004	0	0.0004	0.0015	0.4860	766.39
21602M005	WHJF	0.0009	86	0.0006	0.0011	12.4574	69.57
21602S004	21602S005	0.0013	81	0.0012	0.0012	142.4361	9.22
21602S004	WHJF	0.0012	158	0.0010	0.0007	154.3906	7.76
21602S005	WHJF	0.0009	86	0.0006	0.0011	12.4048	69.87

The full covariance matrix of the points of interest is presented in annex 5.10. and the complete results in annex 5.9.

4. Results

The final results have been processed with the "Microsearch GeoLab" software.
The input files for Geolab were developed from all the terrestrial observations (distances, horizontal and vertical angles, planimetric and altimetric centrings, levelling) and the GPS solution (set of points coordinates and the associated covariance matrix). The datum has been defined by the GPS solutions.

The results of the adjustment are the coordinates of all the points of interest as well as their confidence ellipsoids in the ITRF 2000 at the mean epoch of the observations (2003:342). Here is a table with the 3D coordinates and confidence region at 95% of the 5 points of interest :

```
Adjusted XYZ Coordinates:
                           X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION               STD DEV            STD DEV            STD DEV
 ---- --- ------------ ------------------ ------------------ ------------------


2-D and 1-D Station Confidence Regions (95.000 and 95.000 percent):
STATION            MAJOR SEMI-AXIS  AZ     MINOR SEMI-AXIS             VERTICAL
------------ --------------------- --- ------------------- --------------------


3D Station Confidence Regions (95.000 percent):
STATION         MAJ-SEMI (AZ,VANG)    MED-SEMI (AZ,VANG)    MIN-SEMI (AZ,VANG)
------------ --------------------- --------------------- ---------------------
```

Furthermore the whole covariance matrix is computed and it is possible to extract from it the covariance submatrix of the following reference points :

- § WUHN IGS GPS station 21602M001
- § JIUB DORIS station reference point 21602S005
- § JIUB DORIS station mark 21602M005
- § EGNOS station reference point 21602M002
- § WHJF station reference point 21602M003
- § SLR System Reference Point 21602S004

The results and the full covariance matrix are presented in Annex 5.11. and 5.12. The covariance matrix has finally been converted into SINEX format using a special program from CATREF package. The resulted file is given in annex 5.15.

5. ANNEXES

5.1. WUHN site log

```
     WUHN Site Information Form
     International GPS Service
     See Instructions at:
       ftp://igscb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0.   Form

     Prepared by (full name)  : Jingnan Liu
     Date Prepared            : 2002-10-27
     Report Type              : UPDATE
     If Update:
      Previous Site Log       : wuhn_20010409.log
      Modified/Added Sections : 1,2,3.1,4.1,4.2,4.4,5.1,7.1,11,13


1.  Site Identification of the GNSS Monument

     Site Name                : WUHAN
     Four Character ID        : WUHN
     Monument Inscription     : I.G.S. Reference Station
     IERS DOMES Number        : 21602M001
     CDP Number               : A4
     Monument Description     : PILLAR
       Height of the Monument : 2.46m
       Monument Foundation    : GRANITE BLOCK
       Foundation Depth       :
     Marker Description       : CHISELLED BRASS NAIL
     Date Installed           : 1993-01-08
     Geologic Characteristic  : GRAVEL
       Bedrock Type           : SEDIMENTARY
       Bedrock Condition      : FRESH
       Fracture Spacing       : 1-10 cm
       Fault zones nearby     : NO
         Distance/activity    :
     Additional Information   : The old steel pillar was removed and replaced
                                with granite pillar to support GPS antenna.

2.   Site Location Information

     City or Town             : Wuhan City
     State or Province        : HuBei Province
     Country                  : P.R. China
     Tectonic Plate           : Euro-Asia Plate
     Approximate Position (ITRF)
       X coordinate (m)       : -2267749.14
       Y coordinate (m)       :  5009154.34
       Z coordinate (m)       :  3221290.73
       Latitude (N is +)      :  +303154.12
       Longitude (E is +)     : +1142126.28
       Elevation (m,ellips.)  :       25.8
     Additional Information   :

3.  GNSS Receiver Information

3.1  Receiver Type            : MINIMAC 2816AT
     Satellite System         : GPS
     Serial Number            : 0113-01
     Firmware Version         : 1.65
     Elevation Cutoff Setting : 15
     Date Installed           : 1993-01-08
     Date Removed             : 1995-01-26
     Temperature Stabiliz.    :
     Additional Information   :

3.2  Receiver Type            : ROGUE SNR-8000
     Satellite System         : GPS
     Serial Number            : T400
     Firmware Version         : 3.2.32.8
     Elevation Cutoff Setting : 15
     Date Installed           : 1995-01-26
```

```
     Date Removed             : 1999-09-22
     Temperature Stabiliz.    :
     Additional Information   :

3.3  Receiver Type            : ROGUE SNR-8000
     Satellite System         : GPS
     Serial Number            : T400
     Firmware Version         : 3.2.32.9
     Elevation Cutoff Setting : 10
     Date Installed           : 1999-09-22
     Date Removed             : 2000-06-07
     Temperature Stabiliz.    : 25
     Additional Information   :

3.4  Receiver Type            : ASHTECH Z-XII3
     Satellite System         : GPS
     Serial Number            : LP03210
     Firmware Version         : CD00-1D02
     Elevation Cutoff Setting : 10
     Date Installed           : 2000-06-08
     Date Removed             : CCYY-MM-DDThh:mmZ
     Temperature Stabiliz.    : 25
     Additional Information   : (multiple lines)

3.x  Receiver Type            : (A20, from rcvr_ant.tab; see instructions)
     Satellite System         : (GPS/GLONASS/GPS+GLONASS)
     Serial Number            : (A5)
     Firmware Version         : (A11)
     Elevation Cutoff Setting : (deg)
     Date Installed           : (CCYY-MM-DDThh:mmZ)
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Temperature Stabiliz.    : (none or tolerance in degrees C)
     Additional Information   : (multiple lines)

4.  GNSS Antenna Information

4.1  Antenna Type             : AOAD/M_T
     Serial Number            : 255
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  : 2.320
     Marker->ARP North Ecc(m) :
     Marker->ARP East Ecc(m)  :
     Alignment from True N    :
     Antenna Radome Type      : NONE
     Radome Serial Number     :
     Antenna Cable Type       :
     Antenna Cable Length     :
     Date Installed           : 1994-10-01
     Date Removed             : 1995-01-26
     Additional Information   : A MAC4647942 antenna with no radome was used
                              : at WUHN from 1993-01-08 to 1994-09-30, at an
                              : antenna height of 2.243m. Contact WHU for more
                              : information.

4.2  Antenna Type             : AOAD/M_T
     Serial Number            : 255
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  : 2.320
     Marker->ARP North Ecc(m) :
     Marker->ARP East Ecc(m)  :
     Alignment from True N    :
     Antenna Radome Type      : NONE
     Radome Serial Number     :
     Antenna Cable Type       :
     Antenna Cable Length (m) : 15
     Date Installed           : 1995-01-27
     Date Removed             : 2000-06-07
     Additional Information   :

4.3  Antenna Type             : ASH700936E      SNOW
     Serial Number            : CR15810
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  : 2.320
     Marker->ARP North Ecc(m) :
     Marker->ARP East Ecc(m)  :
```

```
     Alignment from True N    :
     Antenna Radome Type      : SNOW
     Radome Serial Number     :
     Antenna Cable Type       : (vendor & type number)
     Antenna Cable Length (m) : 15
     Date Installed           : 2000-06-08
     Date Removed             : 2002-01-23
     Additional Information   :

4.4  Antenna Type             : ASH700936E      SNOW
     Serial Number            : CR15810
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  :  2.3610
     Marker->ARP North Ecc(m) : -0.0094
     Marker->ARP East Ecc(m)  : -0.0022
     Alignment from True N    :
     Antenna Radome Type      : SNOW
     Radome Serial Number     : DOME, Outer Fiber Reinforced Plastic Dome,
                              : Half Sphere, 140cm Diameter
     Antenna Cable Type       : CL2X
     Antenna Cable Length(m)  : 15
     Date Installed           : 2002-01-26
     Date Removed             : CCYY-MM-DDThh:mmZ
     Additional Information   :

4.x  Antenna Type             : (A20, from rcvr_ant.tab; see instructions)
     Serial Number            : (A*, but note the first A5 is used in SINEX)
     Antenna Reference Point  :
     Marker->ARP Up Ecc. (m)  :
     Marker->ARP North Ecc(m) : (F8.4)
     Marker->ARP East Ecc(m)  : (F8.4)
     Alignment from True N    : (deg; + is clockwise/east)
     Antenna Radome Type      : (A4 from rcvr_ant.tab; see instructions)
     Radome Serial Number     :
     Antenna Cable Type       : (vendor & type number)
     Antenna Cable Length     : (m)
     Date Installed           : (CCYY-MM-DDThh:mmZ)
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Additional Information   : (multiple lines)

5.  Surveyed Local Ties


5.1  Tied Marker Name         : WH1A
     Tied Marker Usage        : CHAMP
     Tied Marker CDP Number   : (A4)
     Tied Marker DOMES Number : (A9)
     Differential Components from GNSS Marker to the tied monument (ITRS)
       dx (m)                 : -0.609
       dy (m)                 :  1.442
       dz (m)                 : -2.691
     Accuracy (mm)            : 20 mm
     Survey method            : GPS CAMPAIGN
     Date Measured            : 1992-01-01
     Additional Information   : (multiple lines)

5.x  Tied Marker Name         :
     Tied Marker Usage        : (SLR/VLBI/LOCAL CONTROL/FOOTPRINT/etc)
     Tied Marker CDP Number   : (A4)
     Tied Marker DOMES Number : (A9)
     Differential Components from GNSS Marker to the tied monument (ITRS)
       dx (m)                 : (m)
       dy (m)                 : (m)
       dz (m)                 : (m)
     Accuracy (mm)            : (mm)
     Survey method            : (GPS CAMPAIGN/TRILATERATION/TRIANGULATION/etc)
     Date Measured            : (CCYY-MM-DDThh:mmZ)
     Additional Information   : (multiple lines)

6.   Frequency Standard


6.1  Standard Type            : CESIUM
       Input Frequency        : 5MHz
       Effective Dates        : (1995-01-01/1999-10-31)
```

```
       Notes                  : exact date in 1995 not known

6.x  Standard Type            : (INTERNAL or EXTERNAL H-MASER/CESIUM/etc)
       Input Frequency        : (if external)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

7.   Collocation Information


7.1  Instrumentation Type     : SLR
       Status                 : PERMANENT
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

7.x  Instrumentation Type     : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/TIME/etc)
       Status                 : (PERMANENT/MOBILE)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

8.   Meteorological Instrumentation


8.1.1  Humidity Sensor Model  : Weather Monitor II
       Manufacturer           : Davis Instrument. USA
       Serial Number          : 7440
       Data Sampling Interval : 30 minutes
       Accuracy (% rel h)     : (% rel h)
       Aspiration             : (UNASPIRATED/NATURAL/FAN/etc)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : 2000-03-17
       Notes                  : (multiple lines)

8.1.x  Humidity Sensor Model  :
       Manufacturer           :
       Serial Number          :
       Data Sampling Interval : (sec)
       Accuracy (% rel h)     : (% rel h)
       Aspiration             : (UNASPIRATED/NATURAL/FAN/etc)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

8.2.1  Pressure Sensor Model  : Weather Monitor II
       Manufacturer           : Davis Instrument. USA
       Serial Number          :
       Data Sampling Interval :
       Accuracy               : (mbar)
       Height Diff to Ant     : 2m
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : 2000-03-17/CCYY-MM-DD
       Notes                  : (multiple lines)

8.2.x  Pressure Sensor Model  :
       Manufacturer           :
       Serial Number          :
       Data Sampling Interval : (sec)
       Accuracy               : (hPa)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

8.3.1  Temp. Sensor Model     : Weather Monitor II
       Manufacturer           : Davis Instrument. USA
       Serial Number          : 7440  CE98
       Data Sampling Interval : 30 minutes
       Accuracy               : (deg C)
       Aspiration             : (UNASPIRATED/NATURAL/FAN/etc)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : 2000-03-17
       Notes                  : (multiple lines)
```

```
8.3.x  Temp. Sensor Model     :
       Manufacturer           :
       Serial Number          :
       Data Sampling Interval : (sec)
       Accuracy               : (hPa)
       Aspiration             : (UNASPIRATED/NATURAL/FAN/etc)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

8.4.1  Water Vapor Radiometer :
       Manufacturer           :
       Serial Number          :
       Distance to Antenna    : (m)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : CCYY-MM-DD/CCYY-MM-DD
       Notes                  : (multiple lines)

8.4.x  Water Vapor Radiometer :
       Manufacturer           :
       Serial Number          :
       Distance to Antenna    : (m)
       Height Diff to Ant     : (m)
       Calibration date       : (CCYY-MM-DD)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Notes                  : (multiple lines)

8.5.1  Other Instrumentation  : (multiple lines)

8.5.x  Other Instrumentation  :

9.  Local Ongoing Conditions Possibly Affecting Computed Position


9.1.x  Radio Interferences    : (TV/CELL PHONE ANTENNA/RADAR/etc)
       Observed Degredations  : (SN RATIO/DATA GAPS/etc)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Additional Information : (multiple lines)

9.2.x  Multipath Sources      : (METAL ROOF/DOME/VLBI ANTENNA/etc)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Additional Information : (multiple lines)

9.3.x  Signal Obstructions    : (TREES/BUILDLINGS/etc)
       Effective Dates        : (CCYY-MM-DD/CCYY-MM-DD)
       Additional Information : (multiple lines)

10.   Local Episodic Effects Possibly Affecting Data Quality


10.x Date                     : (CCYY-MM-DD/CCYY-MM-DD)
     Event                    : (TREE CLEARING/CONSTRUCTION/etc)

11.   On-Site, Point of Contact Agency Information

     Agency                   : Wuhan University
     Preferred Abbreviation   : WHU
     Mailing Address          : Prof. Jingnan Liu
                              : President Office, Wuhan University,
                              : 39 Luoyu Road
                              : Wuhan  P.R. China  430079
     Primary Contact
       Contact Name           : Prof. Jingnan Liu
       Telephone (primary)    : 86-27-87875571 EXT 2864
       Telephone (secondary)  : 86-27-87645434
       Fax                    :
       E-mail                 : igswtu@public.wh.hb.cn
     Secondary Contact
       Contact Name           : Miranda Chin
       Telephone (primary)    : 301-713-2844
       Telephone (secondary)  :
       Fax                    : 301-713-4475
```

```
      E-mail                : miranda@gracie.grdl.noaa.gov
    Additional Information  : (multiple lines)

12. Responsible Agency (if different from 11.)

    Agency                  : (multiple lines)
    Preferred Abbreviation  : (A10)
    Mailing Address         : (multiple lines)
    Primary Contact
      Contact Name          :
      Telephone (primary)   :
      Telephone (secondary) :
      Fax                   :
      E-mail                :
    Secondary Contact
      Contact Name          :
      Telephone (primary)   :
      Telephone (secondary) :
      Fax                   :
      E-mail                :
    Additional Information  : (multiple lines)

13. More Information

    Primary Data Center     : NGS/NOAA
    Secondary Data Center   : SIO
    URL for More Information :
      Hardcopy on File
      Site Map              : (Y or URL)
      Site Diagram          : (Y)
      Horizon Mask          : (Y)
      Monument Description  : (Y)
      Site Pictures         : (Y)
    Additional Information  : (multiple lines)
    Antenna Graphics with Dimensions



            TURBOROGUE: DORNE MARGOLIN T

                       -----
                     /     +     \                      <--  0.128  L2
                    |      +      |                     <--  0.110  L1
  +-------------------------------------------------+    <--  0.102  TCR
  |                                                 |
  |                                                 |
  |                                                 |
  |                                                 |
+-+-------------------------------------------------+-+  <--  0.038
+-------------------+-------------+-------------------+  <--  0.035  BCR
                    |             |
                    |             |
                    +------x------+                      <--  0.000  ARP

<--                      0.381                      -->


   ARP: Antenna Reference Point
   L1 : L1 Phase Center                 L2 : L2 Phase Center
   TCR: Top of Choke ring                BCR: Bottom of Choke ring
```

5.2. SLR site log

```
     ILRS Site and System Information Form
     International Laser Ranging Service

0.   Form

     Prepared by (Full Name)    : Guo Tangyong
     Preparer E-mail            : whslr@public.wh.hb.cn
     Date Prepared              : 2002-05-09
     Report Type                : UPDATE
     Format Version             : 1.0


1.   Identification of the Ranging System Reference Point (SRP)

     Site Name                  : Wuhan SLR Station
     IERS DOMES Number          : 21602S004
     CDP Pad ID                 : 7231
     Subnetwork                 : WPLTN
     Description                : AZ EL INTERSECT
     Monument Description       : N.A.
     Monument Inscription       : N.A.
     Mark Description           : N.A.
     Date Installed             : 1999-12-28
     Date Removed               : (yyyy-mm-dd)
     Geologic Characteristic    : BEDROCK
     Additional Information     : (multiple lines)


2.   Site Location Information

     City or Town               : Wuhan
     State or Province          : Wuhan, Hubei
     Country                    : China
     Tectonic Plate             : Eurasian
     Approximate Position
       X coordinate          [m]: -2279714.2
       Y coordinate          [m]:  5004767.5
       Z coordinate          [m]:  3219794.0
       Latitude           [deg]:  30.5157 N
       Longitude          [deg]: 114.4897 E
       Elevation             [m]: 86.551
     Additional Information     : (multiple lines)


3.   General System Information

3.01 System Name                : Wuhan
     4-Character Code           : WUHL
     CDP System Number          : 29
     CDP Occupation Number      : 01
     Eccentricity to SRP (if Not Identical With SRP)
       North                 [m]: (m +- m)
       East                  [m]: (m +- m)
       Up                    [m]: (m +- m)
       Date Measured            : (yyyy-mm-dd)
     Date Installed             : 1999-12-28
     Date Removed               : (yyyy-mm-dd)
     Additional Information     : (multiple lines)


4.   Telescope Information

4.01 Receiving Telescope Type   : Paraboloid reflect
       Aperture             [m]: 0.60
       Mount                   : AZ-EL
     Xmitting Telescope Type    : GALILEI
       Aperture             [m]: 0.15
     Tracking Camera Type       : ICCD
       Model                   : M40
       Manufacturer            : YNGYC
```

```
       Field of View       [deg]: 0.05
       Minimum Magnitude   [mag]: 13
     Transmit/Receive Path      : SEPARATE
     Transmit/Receive Switch    : NONE
     Max Slew Rate Az    [deg/s]: 5
     Max Slew Rate El    [deg/s]: 5
     Max Used Tracking Rate Az  : 2
     Max Used Tracking Rate El  : 2
     Telescope Shelter          : SEALED DOME
     Daylight Filter Type       : Unknown
     Dayl. Filt. Bandwidth  [nm]: 0.3
     Adjustable Attenuation     : TRANSMIT
     Transmit Efficiency        : 0.38
     Receive Efficiency         : 0.45
     Date Installed             : 1999-12-28
     Date Removed               : (yyyy-mm-dd)
     Additional Information     : (multiple lines)


5.   Laser System Information

5.01 Laser Type                 : Nd:YAG
     Number of Amplifiers       : 1
     Primary Wavelength     [nm]: 1064
     Primary Maximum Energy [mJ]: not used for laser ranging
     Secondary Wavelength   [nm]: 532.1
     Secondary Max. Energy  [mJ]: 30
     Xmit Energy Adjustable     : NO
     Pulse Width (FWHM)     [ps]: 30
     Max. Repetition Rate   [Hz]: 10
     Fullw. Beam Divergence  ["]: 10-60
     Final Beam Diameter     [m]: 0.07
     Eyesafe                    : NO
     Eyesafe Standard           : N.A.
     Date Installed             : 2000-04-20
     Date Removed               : (yyyy-mm-dd)
     Additional Information     : One Double-Lamp Power Amp


6.   Receiver System

6.01.01 Primary Chain
        Wavelength          [nm]: 532
        Detector Type           : CSPAD
          Manufacturer          : PESO Consulting
          Model                 : 0407
          Quantum Efficiency [%]: 20
          Nominal Gain          :
          Rise Time         [ps]: <100
          Jitter (Single PE)[ps]: 22
          Field of View      ["]: 120
          Date Installed        : 1999-05-01
          Date Removed          : (yyyy-mm-dd)
        Signal Processing       : Time Walk Compensated
          Manufacturer          : Graz
          Model                 :
          Date Installed        : (yyyy-mm-dd)
          Date Removed          : (yyyy-mm-dd)
          Amplitude Measurement : NO
          Return-rate Controlled: NO
          Mode of Operation     : Single to Multi Photons
        Time of Flight Observ.  : INTERVAL
          Manufacturer          : Stanford
          Model                 : 620
          Resolution        [ps]: 4
          Precision         [ps]: 30
          Date Installed        : 1999-01-01
          Date Removed          : (yyyy-mm-dd)
        Additional Information  : (multiple lines)


7.   Tracking Capabilities

7.01 Satellites
       Very Low Alt (<400 km)   : YES
```

```
        Low Altitude (400-2000)  : YES
        Lageos                   : YES
        GLONASS                  : YES
        Etalon                   : YES
        GPS                      : YES
        Moon                     : NO
      Avge Pass Switch Time   [s]: 20
      Average values for Lageos
        Single Shot RMS      [mm]: 20
        # of Obs per NP           : 20
        Use of Semi-trains        : YES
        # of Semi-train Tracks    : 4
      Range Gate Width       [ns]: 10-10000
      Beam Pointing Accuracy  ["]: 5
      Angle Encoder Resolution["]: 1
      Min. Tracking Elev.   [deg]: 12
      Operation
        Months per Year           : 12
        Days per Week             : 7
        Hours per Day             : 15
        Staff per Shift           : 1
        System Shared With        : NOTHING
        Time Allocated to SLR [%]: 100
        Remotely Controllable     : NO
      Date First Applicable       : 2000-01-15
      Date Last Applicable        : (yyyy-mm-dd)
      Additional Information      : (multiple lines)


  8.   Calibration

  8.01 Calibration Type            : PRE+POST
       Target Location             : EXTERNAL
       Target Type                 : FLAT SURFACE
       Target Structure            : METAL POLE
       Target Distance         [m]: 0.715
         Date Measured             : 1999-05-01
         Accuracy (mm)        [mm]: 4
         Verification              : (multiple lines)
       Return-rate Controlled      : NO
       Mode of Operation           : Single to Multi Photons
       Average Cal Interval  [min]: 180
       Single Shot RMS        [mm]: 10
       Edit Criterion 1st Chain    : ITERATIVE 2.2 SIGMA
       Edit Criterion 2nd Chain    : N.A.
       Application of Cal Data     : AVERAGE
       Date Installed              : 1999-01-15
       Date Removed                : (yyyy-mm-dd)
       Additional Information      : (multiple lines)


  9.   Time and Frequency Standards

  9.01.01 Frequency Standard Type : Oven Controlled Crystal Oscillator
          Model                   : 58503
          Manufacturer            : HP
          Short Term Stab.  [e-12]: 5
          Long Term Stab.   [e-12]: 1
          Time Reference          : GPS
          Synchronization         : GPS
          Epoch Accuracy      [ns]: 150
          Date Installed          : 1999-03-15
          Date Removed            : (yyyy-mm-dd)
          Additional Information  : (multiple lines)

  9.02.01 GPS Timing Rcvr Model   : 58503
          Manufacturer            : HP
          Date Installed          : 1999-03-15
          Date Removed            : (yyyy-mm-dd)
          Additional Information  : (multiple lines)


 10.   Preprocessing Information

 10.01 On-site NP Generation      : YES
```

```
      Data Screening             : IRV+POLYNOMIAL
      Edit Criterion 1st Chain   : MANUAL
      Edit Criterion 2nd Chain   : NONE
      Upload interval            : HOURLY
      Date First Applicable      : 2000-04-26
      Date Last Applicable       : (yyyy-mm-dd)
      Additional Information     : (multiple lines)


11.   Aircraft Detection

11.01 Detection Type             : MOUNT OBSERVER
      Date Installed             : 2000-04-01
      Date Removed               : (yyyy-mm-dd)
      Additional Information     : (multiple lines)


12.   Meteorological Instrumentation

12.01.01 Pressure Sensor Model   : WUPTH
         Manufacturer            : C&D
         Recording Interval      : PER PASS
         Accuracy          [mbar]: ~ 0.8
         Height Diff to SRP   [m]: ~ -1.1
         Date Installed          : 2000-04-01
         Calibration Interval    : YEARLY
         Date Removed            : (yyyy-mm-dd hh:mm UT)
         Additional Information  : (multiple lines)

12.02.01 Temp Sensor Model       : WUPTH
         Manufacturer            : C&D
         Recording Interval      : PER PASS
         Accuracy         [deg C]: 0.2
         Date Installed          : 2000-04-01
         Calibration Interval    : YEARLY
         Date Removed            : (yyyy-mm-dd hh:mm UT)
         Additional Information  : (multiple lines)

12.03.01 Humidity Sensor Model   : WUPTH
         Manufacturer            : C&D
         Recording Interval      : PER PASS
         Accuracy       [% rel h]: 3
         Date Installed          : 2000-04-01
         Calibration Interval    : YEARLY
         Date Removed            : (yyyy-mm-dd hh:mm UT)
         Additional Information  : (multiple lines)

13.   Local Ties, Eccentricities, and Collocation Information

13.01 Collocated Permanent Geodetic Systems

      GPS                        : IGS
        Date Installed           : 1993-01-08
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
      GLONASS                    : YES
        Date Installed           : 1999-05-05
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
      DORIS                      : NO
        Date Installed           : (yyyy-mm-dd)
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
      PRARE                      : NO
        Date Installed           : (yyyy-mm-dd)
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
      VLBI                       : NO
        Date Installed           : (yyyy-mm-dd)
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
      Gravimeter                 : SUPERCONDUCTING & ABSOLUTE
        Date Installed           : 1990-01-01
        Date Removed             : (yyyy-mm-dd)
        Additional Information   : (multiple lines)
```

```
 13.02.01 Local Ties from the SRP to Other Monuments or Systems on Site

          Monument Name           :
          Instrumentation Type    : (GPS/GLONASS/DORIS/PRARE/SLR/VLBI/NONE)
          Instrumentation Status  : (PERMANENT/MOBILE)
          DOMES Number            : (XXXXXXXXX)
          CDP Number              : (XXXX)
          Differential Components (ITRS)
            dx                [m]: (m +- m)
            dy                [m]: (m +- m)
            dz                [m]: (m +- m)
            Date Measured         : (yyyy-mm-dd)
            Determined by         :
          Date Installed          : (yyyy-mm-dd)
          Date Removed            : (yyyy-mm-dd)
          Additional Information  : (multiple lines)

14.   Local Events Possibly Affecting Computed Position

 14.01 Date                      : (yyyy-mm-dd hh:mm UT)
       Event                     : (EARTHQUAKE/CONSTRUCTION/etc)
       Additional Information    : (multiple lines)


 15.   On-Site, Point of Contact Agency Information

       Agency                    : Institute of Seismology, China Seismological Bureau
       Mailing Address           : No. 70 Central Xiao Hong Shan district,
                                   Wuhan 430071, P.R. China
       Primary Contact
         Contact Name            : SLR group
         Telephone (primary)     :
         Telephone (secondary)   :
         Fax                     :
         E-mail                  : whslr@public.wh.hb.cn
       Secondary Contact
         Contact Name            : SLR group
         Telephone (primary)     :
         Telephone (secondary)   :
         Fax                     :
         E-mail                  : whslr@public.wh.hb.cn
       Additional Information    : (multiple lines)


 16.   Responsible Agency (if different from 15.)

       Agency                    : (multiple lines)
       Mailing Address           : (multiple lines)
       Primary Contact
         Contact Name            :
         Telephone (primary)     :
         Telephone (secondary)   :
         Fax                     :
         E-mail                  :
       Secondary Contact
         Contact Name            :
         Telephone (primary)     :
         Telephone (secondary)   :
         Fax                     :
         E-mail                  :
       Additional Information    :

 17.   More Information

       URL for More Information  : N.A.
       Hardcopy on File
         Site Map                : NO
         Site Diagram            : NO
         Horizon Mask            : NO
         Monument Description    : NO
         Site Pictures           : NO
       Additional Information    : (multiple lines)
```

5.3. SLR descriptions

Choke ring antenna set up on the translation stage which is put on top of the SLR and is centered on the SLR vertical rotation axis

Determination of the vertical eccentricity by indirect levelling

5.4. DORIS site log

```
   JIUFENG DORIS site description form

0. Form
   Prepared by       : SIMB (DORIS installation and maintenance department)
   Date prepared     : 6/05/2004
   Report type       : NEW

1. Site location information
   Site name               : JIUFENG
   Site DOMES number       : 21602
   Host agency             : Institute of Geodesy and Geophysics
   City                    : Jiufeng
   State or province       : Hubei
   Country                 : CHINA
   Tectonic plate          :
   Geological information  :

   Geographical coordinates (ITRF) :
          North Latitude   :  30 deg 30' 56''
          East Longitude   : 114 deg 29' 23''
          Ellipsoid height :   86 m
   Approximate altitude    :

2. DORIS antenna and reference point information

2.1
   Four character ID        : JIUB
   Antenna model            : Starec 52291 type 2
   Antenna serial number    : 100
   IERS DOMES number        : 21602S005
   CNES/IGN number          : 216021
   CTDP number              : 236
   Date installed (dd/mm/yy): 10/12/2003
   Date removed (dd/mm/yy)  :
   Antenna support type     : 1.5 meter high, 50 cm sided square concrete pillar
   Installed on             : ground (the pillar foundations are 2 m deep)
   Height above ground mark : 0.486 m
   Ground mark type         : Domed brass screw at the top of the pillar
   Ground mark DOMES number : 21602M005
   Notes                    :


3. DORIS beacons information

3.1
   Beacon serial number        : 28 19 031
   Beacon model                : 3.0
   USO serial number           : 3.216
   4 Char. ID of the REF point : JIUB
   Date installed (dd/mm/yy)   : 01/12/2003
   Date removed (dd/mm/yy)     :


4. ITRF coordinates and velocities of the current DORIS ref. point (JIUB)
   Solution : ITRF2000 frame
   Epoch    : 1997.0
   X = -2279839.34 m     Y = 5004701.61 m     Z = 3219776.01 m
   Sig X = 0.02 m         Sig Y = 0.02 m         Sig Z = 0.02 m
   VX = -0.0325 m/y        VY = -0.0077 m/y        VZ = -0.0119 m/y
   Sig VX = 0.0007 m/y     Sig VY = 0.0012 m/y     Sig VZ = 0.0009 m/y

5. IERS co-location information
5.1
   Instrument type       : SLR
   Status                : Permanent
   DOMES number of the
   instrument ref. point : 21602S004
   Notes                 :

6. Tide Gauge co-location information
```

7. Local site ties

8. Meteorological Instrumentation

8.1 Humidity sensor
   Model : HMP45D
   Manufacturer : VAISALA
   Accuracy : .+/- 3 percents
   Notes :

8.2 Pressure sensor
   Model : PTU200 class B
   Manufacturer : VAISALA
   Accuracy : +/- 0.25 mb
   Height : m above the current DORIS ref. point (JIUB)
   Notes : long term stability = +/- 0.1 mb/year

8.3 Temperature sensor
   Model : HMP45D
   Manufacturer : VAISALA
   Accuracy : +/- 0.5 deg C
   Notes :

9. DORIS network contacts

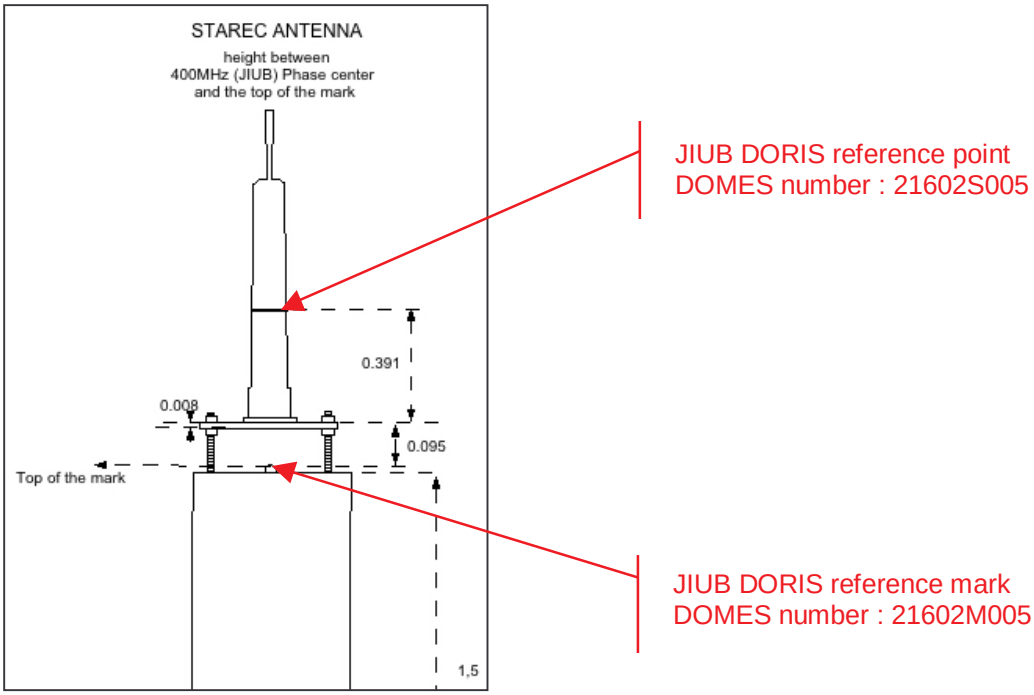
   Primary contact:

   Name : Herve FAGARD
   Agency : Institut Geographique National
   Mailing address : Service de Geodesie et de Nivellement
   : 2 Avenue PASTEUR
   : 94165 SAINT-MANDE CEDEX FRANCE
   Telephone : + 33 1 43 98 81 48
   Fax : + 33 1 43 98 84 50
   E-mail : herve.fagard@ign.fr

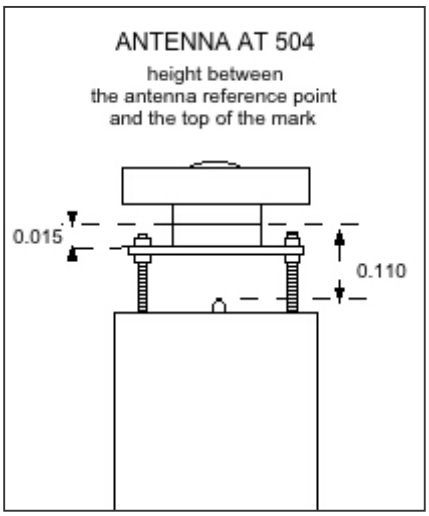
   Secondary contact:

   Name : Francois BOLDO
   Agency : Institut Geographique National
   Mailing address : CNES (ED/AL/MA)
   : 18 Avenue Edouard BELIN
   : 31401 TOULOUSE Cedex FRANCE
   Telephone : + 33 5 61 27 40 72
   Fax : + 33 5 61 28 25 95
   E-mail : Simb.Doris@cnes.fr

5.5. DORIS descriptions



DORIS pier and support description

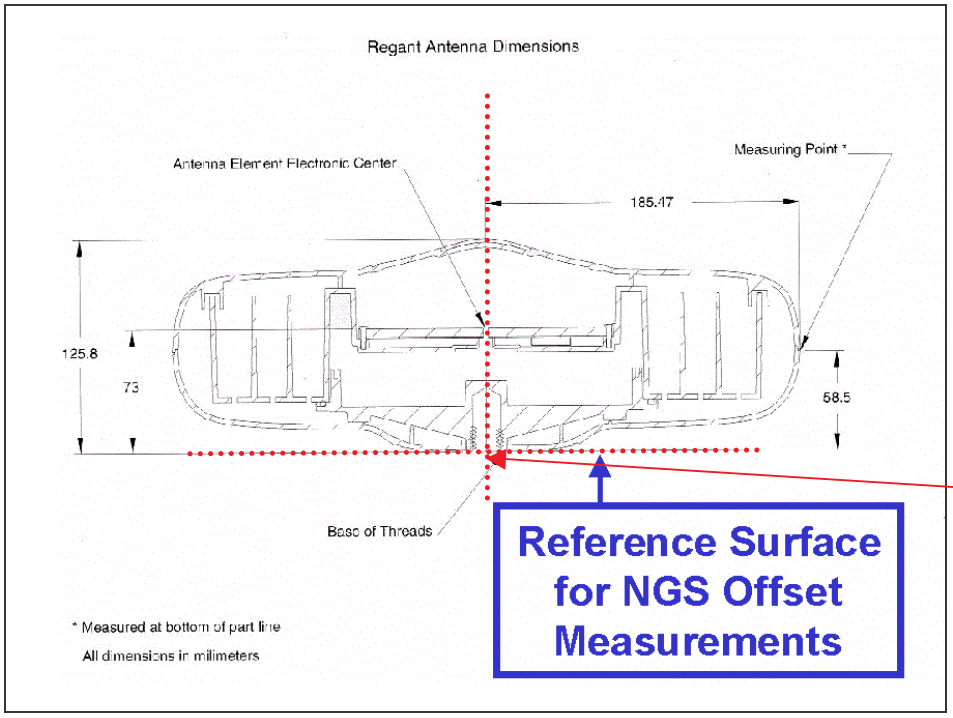


GPS antenna on DORIS support

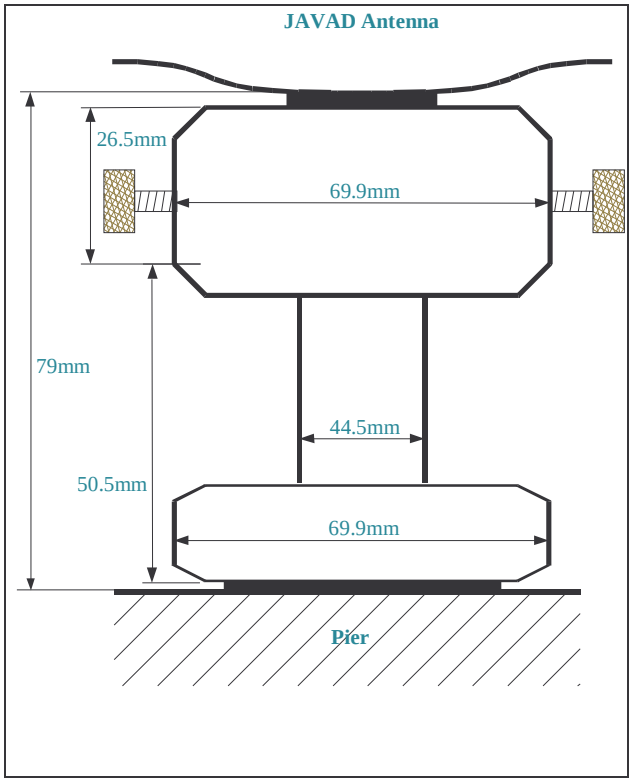
GPS antenna on DORIS support

Tribrach and target on DORIS support

5.6. WHJF documentations



JPSREGANT_DD_E antenna



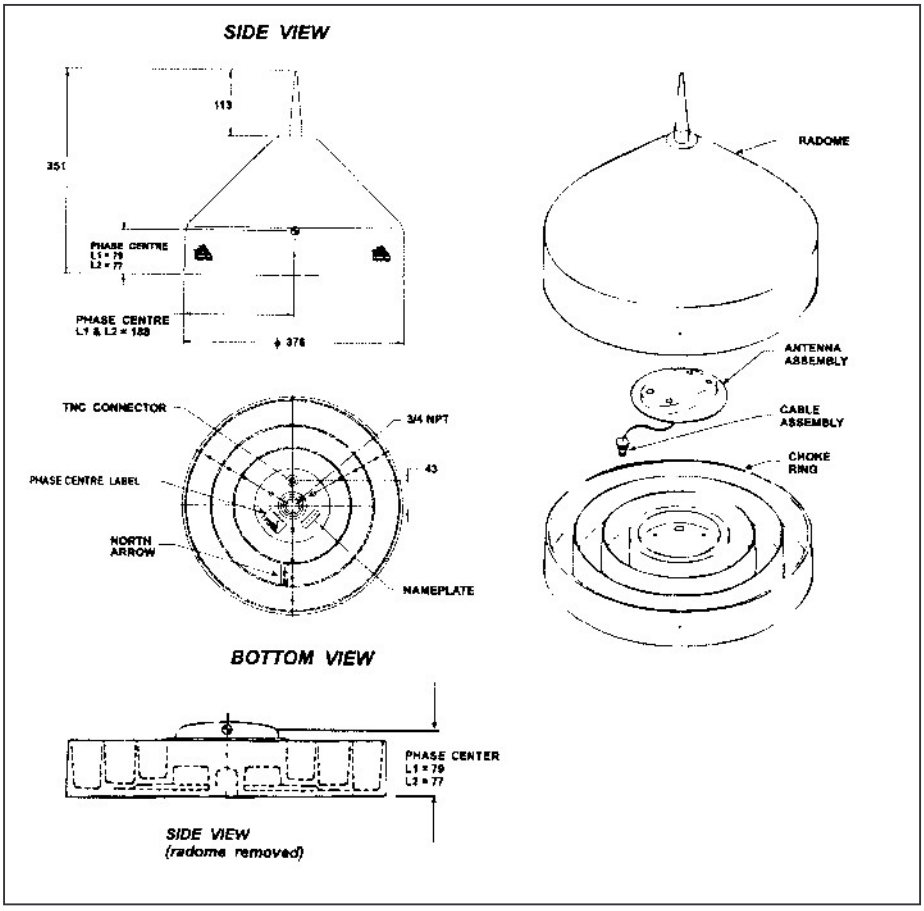
WHJF antenna support

WHJF antenna intersection

References for horizontal determination

Reference for vertical determination

5.7. EGNOS antenna



Mechanical drawing (all size in millimeters except for thread)

EGNOS station : Novatel antenna on its support

References for horizontal determination

Reference for vertical determination

EGNOS benchmark

5.8. GPS network covariance matrix

```
*CMT Input File Name: D:\itrf\surveys\wuhan\calculs\gps\results\WUHNGPS.CRD
3DC
XYZ      21602M001         -2267749.3870       5009154.2720       3221290.6790 m  0
XYZ      WHJF              -2279850.6906       5004696.7114       3219777.7527 m  0
XYZ      21602M002         -2279828.6213       5004706.6947       3219777.6004 m  0
XYZ      01                -2279849.9142       5004695.8827       3219778.8954 m  0
XYZ      05                -2279739.9099       5004743.7325       3219789.3831 m  0
XYZ      02                -2279839.2868       5004701.2813       3219775.7634 m  0
XYZ      09                -2279714.5727       5004767.8058       3219794.2107 m  0
COV  CT UPPR    0.00000    0.00230    0.00000    0.00000    0.00000    0.00000    0.00000 m
ELEM   9.999997982999999e-03  -1.635250263000000e-10  -5.462991243000000e-10 m
ELEM   1.000102838000000e-02  -5.027576114000000e-06  -2.631145326000000e-06 m
ELEM   1.000102461000000e-02  -5.017158487000000e-06  -2.625887724000000e-06 m
ELEM   1.000102739000000e-02  -5.026713251000000e-06  -2.630309302000000e-06 m
ELEM   1.000101661000000e-02  -4.980768762000000e-06  -2.606470503000000e-06 m
ELEM   1.000102716000000e-02  -5.022334399000000e-06  -2.628889721000000e-06 m
ELEM   1.000100924000000e-02  -4.966903019000000e-06  -2.600843705000000e-06 m
ELEM   9.999998482000000e-03   7.057286922000000e-10   3.433398920000000e-06 m
ELEM   9.998944413000000e-03  -7.254792008999999e-07   3.429678427000000e-06 m
ELEM   9.998945016000000e-03  -7.237597312000000e-07   3.434424553000000e-06 m
ELEM   9.998943675000000e-03  -7.261782166000000e-07   3.402616362000000e-06 m
ELEM   9.998953119999999e-03  -7.177413924000000e-07   3.431225849000000e-06 m
ELEM   9.998944898000000e-03  -7.241396647000000e-07   3.396129543000000e-06 m
ELEM   9.998949190000000e-03  -7.153430028000000e-07   0.000000000000000e+00 m
ELEM   9.999997554999999e-03   2.336678683000000e-06   4.687439452000000e-07 m
ELEM   1.000007030000000e-02   2.330429340000000e-06   4.687317753000000e-07 m
ELEM   1.000007108000000e-02   2.335284600000000e-06   4.701772526000000e-07 m
ELEM   1.000007087000000e-02   2.314120144000000e-06   4.630871405000000e-07 m
ELEM   1.000006933000000e-02   2.333515392000000e-06   4.686998488000000e-07 m
ELEM   1.000007124000000e-02   2.308818743000000e-06   4.579467729000000e-07 m
ELEM   1.000006284000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.318130930000000e-02  -3.127618322000000e-03  -1.583198143000000e-03 m
ELEM   1.276548787000000e-02  -2.736455347000000e-03  -1.379842305000000e-03 m
ELEM   1.296106240000000e-02  -2.915773500000000e-03  -1.473106854000000e-03 m
ELEM   1.297500081000000e-02  -2.929975508000000e-03  -1.480411999000000e-03 m
ELEM   1.297067652000000e-02  -2.927274587000000e-03  -1.479128817000000e-03 m
ELEM   1.296041986000000e-02  -2.912546480000000e-03  -1.473241206000000e-03 m
ELEM   1.842872965000000e-02   3.542554036000000e-03  -2.736553662000000e-03 m
ELEM   1.732918998000000e-02   3.083003851000000e-03  -2.915780398000000e-03 m
ELEM   1.783705121000000e-02   3.296303702000000e-03  -2.930089887000000e-03 m
ELEM   1.787614342000000e-02   3.312241468000000e-03  -2.927328964000000e-03 m
ELEM   1.786801431000000e-02   3.308636240000000e-03  -2.912216826000000e-03 m
ELEM   1.783484236000000e-02   3.296279581000000e-03   0.000000000000000e+00 m

ELEM   1.396273481000000e-02  -1.379880368000000e-03   3.083029129000000e-03 m
ELEM   1.344358882000000e-02  -1.473119948000000e-03   3.296315968000000e-03 m
ELEM   1.368201378000000e-02  -1.480466089000000e-03   3.312226985000000e-03 m
ELEM   1.370042823000000e-02  -1.479157503000000e-03   3.308646064000000e-03 m
ELEM   1.369758590000000e-02  -1.473449602000000e-03   3.296137116000000e-03 m
ELEM   1.368199297000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.297601588000000e-02  -2.936746577000000e-03  -1.481669144000000e-03 m
ELEM   1.287700774000000e-02  -2.844978881000000e-03  -1.434978087000000e-03 m
ELEM   1.286994510000000e-02  -2.837622736000000e-03  -1.431279804000000e-03 m
ELEM   1.287213651000000e-02  -2.839083786000000e-03  -1.431969595000000e-03 m
ELEM   1.287733943000000e-02  -2.846500646000000e-03  -1.434856148000000e-03 m
ELEM   1.788117020000000e-02   3.312000745000000e-03  -2.844867291000000e-03 m
ELEM   1.762624686000000e-02   3.205719476000000e-03  -2.837647485000000e-03 m
ELEM   1.760661550000000e-02   3.197788552000000e-03  -2.839003182000000e-03 m
ELEM   1.761069172000000e-02   3.199582875000000e-03  -2.846765867000000e-03 m
ELEM   1.762738042000000e-02   3.205740998000000e-03   0.000000000000000e+00 m
ELEM   1.369926767000000e-02  -1.434951892000000e-03   3.205730433000000e-03 m
ELEM   1.358183745000000e-02  -1.431332218000000e-03   3.197776375000000e-03 m
ELEM   1.357276488000000e-02  -1.431942483000000e-03   3.199575070000000e-03 m
ELEM   1.357417414000000e-02  -1.434871537000000e-03   3.205799153000000e-03 m
ELEM   1.358182976000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.329224912000000e-02  -3.223156741000000e-03  -1.632175253000000e-03 m
ELEM   1.307028503000000e-02  -3.020475062000000e-03  -1.526299027000000e-03 m
ELEM   1.305031584000000e-02  -3.001218747000000e-03  -1.516767885000000e-03 m
ELEM   1.309435223000000e-02  -3.041638145000000e-03  -1.536969891000000e-03 m
ELEM   1.869271138000000e-02   3.657271253000000e-03  -3.020594477000000e-03 m
```

```
ELEM   1.812452112000000e-02   3.415096002000000e-03  -3.001257312000000e-03 m
ELEM   1.807240981000000e-02   3.393899212000000e-03  -3.041914637000000e-03 m
ELEM   1.818366579000000e-02   3.439722985000000e-03   0.000000000000000e+00 m
ELEM   1.408870074000000e-02  -1.526359666000000e-03   3.415067528000000e-03 m
ELEM   1.381575850000000e-02  -1.516777143000000e-03   3.393887300000000e-03 m
ELEM   1.379253697000000e-02  -1.537098354000000e-03   3.439714417000000e-03 m
ELEM   1.384337158000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.334979761000000e-02  -3.279689283000000e-03  -1.664266551000000e-03 m
ELEM   1.306469791000000e-02  -3.015384197000000e-03  -1.524403515000000e-03 m
ELEM   1.311250562000000e-02  -3.059322159000000e-03  -1.546699826000000e-03 m
ELEM   1.884919961000000e-02   3.722089835000000e-03  -3.015324355000000e-03 m
ELEM   1.811298923000000e-02   3.410736347000000e-03  -3.059416108000000e-03 m
ELEM   1.823343690000000e-02   3.460607732000000e-03   0.000000000000000e+00 m
ELEM   1.416312935000000e-02  -1.524398864000000e-03   3.410779594000000e-03 m
ELEM   1.381251074000000e-02  -1.546700389000000e-03   3.460579274000000e-03 m
ELEM   1.386790716000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.494200633000000e-02  -4.787165754000000e-03  -2.482422525000000e-03 m
ELEM   1.301069357000000e-02  -2.964498466000000e-03  -1.497596596000000e-03 m
ELEM   2.334566321000000e-02   5.541263312000000e-03  -2.964582721000000e-03 m
ELEM   1.796968651000000e-02   3.350357520000000e-03   0.000000000000000e+00 m
ELEM   1.622359546000000e-02  -1.497677414000000e-03   3.350314662000000e-03 m
ELEM   1.374378158000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
ELEM   1.417928634000000e-02  -3.996893058000000e-03  -2.013554521000000e-03 m
ELEM   2.084749467000000e-02   4.582208141000000e-03   0.000000000000000e+00 m
ELEM   1.511950728000000e-02   0.000000000000000e+00   0.000000000000000e+00 m
```

5.9. Jiufeng ground network adjustment results

```
================================================================================
                                wuhnmet.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0001
================================================================================
Tue Jul 12 15:03:48 2005

Input file:  D:\itrf\surveys\wuhan\calculs\wuhn_final_val\metro\wuhnmet.iob
Output file: D:\itrf\surveys\wuhan\calculs\wuhn_final_val\metro\wuhnmet.lst
Options file: C:\Program Files\Microsearch\GeoLab\default.gpj

 ------------------------------------------------------------------------------
|             PARAMETERS               |             OBSERVATIONS              |
|--------------------------------------------------------------------------------|
|   Description    |      Number       |   Description     |      Number       |
|--------------------------------------------------------------------------------|
| No. of Stations  |          43       | Directions        |          92       |
| Coord Parameters |         121       | Distances         |          22       |
| Free Latitudes   |          39       | Azimuths          |           0       |
| Free Longitudes  |          39       | Vertical Angles   |           0       |
| Free Heights     |          43       | Zenithal Angles   |          39       |
| Fixed Coordinates|           8       | Angles            |           0       |
| Astro. Latitudes |           0       | Heights           |           0       |
| Astro. Longitudes|           0       | Height Differences|          47       |
| Geoid Records    |           0       | Auxiliary Params. |           0       |
| All Aux. Pars.   |          45       | 2-D Coords.       |           0       |
| Direction Pars.  |          45       | 2-D Coord. Diffs. |          46       |
| Scale Parameters |           0       | 3-D Coords.       |           9       |
| Constant Pars.   |           0       | 3-D Coord. Diffs. |           0       |
| Rotation Pars.   |           0       |                   |                   |
| Translation Pars.|           0       |                   |                   |
|                  |                   |                   |                   |
|                  |    --------       |                   |    --------       |
| Total Parameters |         166       | Total Observations|         255       |
|--------------------------------------------------------------------------------|
|                      Degrees of Freedom =        89                           |
 ------------------------------------------------------------------------------

--------------------------------------------------------------------------------
                        SUMMARY OF SELECTED OPTIONS
--------------------------------------------------------------------------------
    OPTION                              |   SELECTION
--------------------------------------------------------------------------------
    Computation Mode                    |   Adjustment
    Maximum Iterations                  |   30
    Convergence Criterion               |   0.00010
    Residual Rejection Criterion        |   Tau Max
    Confidence Region Types             |   1D 2D 3D Station Relative
    Relative Confidence Regions         |   All

    Variance Factor (VF) Known          |   Yes
    Scale Covariance Matrix With VF     |   Yes
    Scale Residual Variances With VF    |   No
    Force Convergence in Max Iters      |   No
    Distances Contribute To Heights     |   No
    Compute Full Inverse                |   Yes
================================================================================
                                wuhnmet.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0002
================================================================================
    Optimize Band Width                 |   Yes
    Generate Initial Coordinates        |   Yes
    Re-Transform Obs After 1st Pass     |   Yes
    Geoid Interpolation Method          |   Bi-Quadratic
--------------------------------------------------------------------------------
```

wuhnmet.iob

Microsearch GeoLab, V2001.9.20.0 WGS 84 UNITS: m,GRAD Page 0003

Adjusted PLH Coordinates:

CODE	FFF	STATION	LATITUDE STD DEV	LONGITUDE STD DEV	ELIP-HEIGHT STD DEV	
PLH	000	01	N 30 30 56.091322 0.0007	E114 29 28.553539 0.0006	71.2157 m 0.0017	0
PLH	000	02	N 30 30 55.995343 0.0007	E114 29 28.106755 0.0007	70.0621 m 0.0017	0
PLH	000	05	N 30 30 56.418618 0.0007	E114 29 24.054939 0.0006	74.7722 m 0.0017	0
PLH	000	09	N 30 30 56.365628 0.0008	E114 29 22.815869 0.0007	87.0479 m 0.0017	0
PLH	000	1201	N 30 30 56.091321 0.0007	E114 29 28.553542 0.0006	71.4565 m 0.0017	0
PLH	000	12017	N 30 30 56.042808 0.0007	E114 29 28.566754 0.0006	71.5311 m 0.0017	0
PLH	000	1203	N 30 30 55.796273 0.0007	E114 29 27.802921 0.0007	69.9359 m 0.0017	0
PLH	000	12037	N 30 30 56.041307 0.0007	E114 29 28.565824 0.0007	71.5312 m 0.0017	0
PLH	000	1204	N 30 30 56.154123 0.0007	E114 29 27.662315 0.0007	70.1031 m 0.0017	0
PLH	000	12047	N 30 30 56.041864 0.0007	E114 29 28.565757 0.0007	71.5311 m 0.0017	0
PLH	000	1205	N 30 30 56.418618 0.0007	E114 29 24.054939 0.0007	75.0102 m 0.0017	0
PLH	000	12057	N 30 30 56.041812 0.0007	E114 29 28.565748 0.0007	71.5312 m 0.0017	0
PLH	000	1301	N 30 30 56.091320 0.0007	E114 29 28.553538 0.0006	71.4564 m 0.0017	0
PLH	000	13017	N 30 30 56.042810 0.0007	E114 29 28.566753 0.0006	71.5312 m 0.0017	0
PLH	000	1302	N 30 30 55.995343 0.0007	E114 29 28.106752 0.0007	70.3123 m 0.0017	0
PLH	000	13027	N 30 30 56.041571 0.0007	E114 29 28.565749 0.0007	71.5312 m 0.0017	0
PLH	000	1303	N 30 30 55.796272 0.0007	E114 29 27.802922 0.0007	69.9359 m 0.0017	0
PLH	000	13037	N 30 30 56.041308 0.0007	E114 29 28.565824 0.0007	71.5312 m 0.0017	0
PLH	000	1304	N 30 30 56.154115 0.0007	E114 29 27.662314 0.0007	70.1035 m 0.0017	0
PLH	000	13047	N 30 30 56.041864 0.0007	E114 29 28.565757 0.0007	71.5311 m 0.0017	0
PLH	000	2001	N 30 30 56.091324 0.0007	E114 29 28.553538 0.0007	71.4568 m 0.0017	0
PLH	000	2002	N 30 30 55.995343 0.0007	E114 29 28.106756 0.0007	70.3122 m 0.0017	0
PLH	000	2003	N 30 30 55.796269 0.0007	E114 29 27.802920 0.0007	69.9357 m 0.0017	0
PLH	000	2004	N 30 30 56.154121 0.0007	E114 29 27.662313 0.0007	70.1037 m 0.0017	0
PLH	000	2005	N 30 30 56.418618 0.0007	E114 29 24.054939 0.0007	75.0099 m 0.0017	0
PLH	000	2105	N 30 30 56.418618 0.0007	E114 29 24.054937 0.0007	75.0102 m 0.0017	0
PLH	000	21602M002	N 30 30 56.038401 0.0007	E114 29 27.658577 0.0007	71.4300 m 0.0017	0
PLH	000	21602M005	N 30 30 55.995343 0.0007	E114 29 28.106755 0.0007	69.9671 m 0.0017	0
PLH	000	21602S004	N 30 30 56.365628 0.0008	E114 29 22.815869 0.0007	86.5111 m 0.0017	0
PLH	000	21602S005	N 30 30 55.995343 0.0007	E114 29 28.106755 0.0007	70.4531 m 0.0017	0
PLH	000	2201	N 30 30 56.091322 0.0007	E114 29 28.553539 0.0007	71.4567 m 0.0017	0
PLH	000	2202	N 30 30 55.995343 0.0007	E114 29 28.106755 0.0007	70.3121 m 0.0017	0
PLH	000	2203	N 30 30 55.796271 0.0007	E114 29 27.802921 0.0007	69.9355 m 0.0017	0

```
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================================================================================
Adjusted PLH Coordinates:
                                LATITUDE         LONGITUDE  ELIP-HEIGHT
 CODE FFF STATION                STD DEV           STD DEV      STD DEV
 ---- --- ------------ ----------------- ----------------- ------------
 PLH  000 2204         N 30 30 56.154120 E114 29 27.662314      70.1037 m       0
                                 0.0007            0.0007       0.0017
 PLH  000 3            N 30 30 55.796271 E114 29 27.802921      69.6975 m       0
                                 0.0007            0.0007       0.0017
 PLH  000 4            N 30 30 56.154119 E114 29 27.662314      69.8657 m       0
                                 0.0007            0.0007       0.0017
 PLH  110 6000         N 30 30 56.038400 E114 29 27.658670      68.6615 m       0
                                 0.0000            0.0000       0.0017
 PLH  000 6H           N 30 30 56.038401 E114 29 27.658577      71.7810 m       0
                                 0.0007            0.0007       0.0017
 PLH  000 7000         N 30 30 56.041703 E114 29 28.567055      71.6857 m       0
                                 0.0007            0.0007       0.0017
 PLH  110 9003         N 30 30 56.365630 E114 29 22.815870      86.4612 m       0
                                 0.0000            0.0000       0.0017
 PLH  110 9100         N 30 30 56.365630 E114 29 22.815870      79.8702 m       0
                                 0.0000            0.0000       0.0017
 PLH  110 9101         N 30 30 56.365630 E114 29 22.815870      79.8884 m       0
                                 0.0000            0.0000       0.0017
 PLH  000 WHJF         N 30 30 56.041703 E114 29 28.567055      71.5577 m       0
                                 0.0007            0.0006       0.0017


Adjusted XYZ Coordinates:
                           X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION               STD DEV            STD DEV            STD DEV
 ---- --- ------------ ----------------- ----------------- -----------------
 XYZ      01               -2279849.9138       5004695.8814       3219778.8948 m       0
                                  0.0009             0.0014             0.0010
 XYZ      02               -2279839.2834       5004701.2811       3219775.7628 m       0
                                  0.0009             0.0014             0.0010
 XYZ      05               -2279739.9102       5004743.7341       3219789.3838 m       0
                                  0.0009             0.0014             0.0010
 XYZ      09               -2279714.5731       5004767.8069       3219794.2113 m       0
                                  0.0009             0.0015             0.0010
 XYZ      1201             -2279849.9999       5004696.0701       3219779.0171 m       0
                                  0.0009             0.0014             0.0010
 XYZ      12017            -2279850.6616       5004696.6729       3219777.7679 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1203             -2279833.1567       5004707.3731       3219770.4174 m       0
                                  0.0009             0.0014             0.0010
 XYZ      12037            -2279850.6488       5004696.7046       3219777.7282 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1204             -2279827.4852       5004703.9661       3219779.9960 m       0
                                  0.0009             0.0014             0.0010
 XYZ      12047            -2279850.6435       5004696.6974       3219777.7429 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1205             -2279739.9952       5004743.9207       3219789.5047 m       0
                                  0.0009             0.0014             0.0010
 XYZ      12057            -2279850.6436       5004696.6983       3219777.7415 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1301             -2279849.9997       5004696.0701       3219779.0170 m       0
                                  0.0009             0.0014             0.0010
 XYZ      13017            -2279850.6616       5004696.6730       3219777.7680 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1302             -2279839.3728       5004701.4773       3219775.8898 m       0
                                  0.0009             0.0014             0.0010
 XYZ      13027            -2279850.6453       5004696.7017       3219777.7352 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1303             -2279833.1568       5004707.3731       3219770.4174 m       0
                                  0.0009             0.0014             0.0010
 XYZ      13037            -2279850.6488       5004696.7046       3219777.7281 m       0
                                  0.0009             0.0014             0.0010
 XYZ      1304             -2279827.4853       5004703.9666       3219779.9960 m       0
                                  0.0009             0.0014             0.0010
 XYZ      13047            -2279850.6435       5004696.6974       3219777.7429 m       0
                                  0.0009             0.0014             0.0010
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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0005
================================================================================
Adjusted XYZ Coordinates:
                          X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION              STD DEV            STD DEV            STD DEV
 ---- --- ------------ ----------------- ----------------- -----------------
 XYZ      2001             -2279849.9999      5004696.0704      3219779.0173 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2002             -2279839.3728      5004701.4771      3219775.8898 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2003             -2279833.1567      5004707.3730      3219770.4172 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2004             -2279827.4853      5004703.9667      3219779.9962 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2005             -2279739.9951      5004743.9205      3219789.5045 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2105             -2279739.9952      5004743.9207      3219789.5046 m       0
                                 0.0009            0.0014            0.0010
 XYZ      21602M002        -2279828.6185      5004706.6944      3219777.5997 m       0
                                 0.0009            0.0014            0.0010
 XYZ      21602M005        -2279839.2495      5004701.2066      3219775.7145 m       0
                                 0.0009            0.0015            0.0010
 XYZ      21602S004        -2279714.3814      5004767.3860      3219793.9387 m       0
                                 0.0009            0.0014            0.0010
 XYZ      21602S005        -2279839.4231      5004701.5876      3219775.9613 m       0
                                 0.0009            0.0015            0.0010
 XYZ      2201             -2279849.9999      5004696.0703      3219779.0172 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2202             -2279839.3727      5004701.4771      3219775.8897 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2203             -2279833.1566      5004707.3729      3219770.4172 m       0
                                 0.0009            0.0014            0.0010
 XYZ      2204             -2279827.4854      5004703.9667      3219779.9962 m       0
                                 0.0009            0.0014            0.0010
 XYZ      3                -2279833.0716      5004707.1863      3219770.2963 m       0
                                 0.0009            0.0014            0.0010
 XYZ      4                -2279827.4004      5004703.7801      3219779.8753 m       0
                                 0.0009            0.0014            0.0010
 XYZ      6000             -2279827.6320      5004704.5230      3219776.1939 m       0
                                 0.0006            0.0013            0.0008
 XYZ      6H               -2279828.7438      5004706.9696      3219777.7779 m       0
                                 0.0009            0.0014            0.0010
 XYZ      7000             -2279850.7312      5004696.8065      3219777.8171 m       0
                                 0.0009            0.0014            0.0010
 XYZ      9003             -2279714.3636      5004767.3468      3219793.9134 m       0
                                 0.0006            0.0013            0.0008
 XYZ      9100             -2279712.0098      5004762.1796      3219790.5667 m       0
                                 0.0006            0.0013            0.0008
 XYZ      9101             -2279712.0163      5004762.1938      3219790.5759 m       0
                                 0.0006            0.0013            0.0008
 XYZ      WHJF             -2279850.6855      5004696.7062      3219777.7521 m       0
                                 0.0009            0.0014            0.0010
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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0007
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
DIR               1301         2005             0  0      0.0      1.7      0.3
                                                           8.0      5.2
DIR               1301         2003           367 53     15.0     -1.7     -0.3
                                                           8.0      5.2
DIR               1301         2005             0  0      0.0     -1.1     -0.2
                                                           8.0      5.7
DIR               1301         2004           399 83     14.0      9.4      1.6
                                                           8.0      5.9
DIR               1301         2002           379 18      4.0     -8.3     -1.6
                                                           8.0      5.4
DIR               1304         2005             0  0      0.0     -1.3     -0.3
                                                           8.0      4.8
DIR               1304         2002           219 53     37.0      1.3      0.3
                                                           8.0      4.8
DIR               1304         2005             0  0      0.0     -2.6     -0.5
                                                           8.0      5.1
DIR               1304         2001           199 78     97.0      2.6      0.5
                                                           8.0      5.1
DIR               1304         2005             0  0      0.0     -2.3     -0.4
                                                           8.0      5.6
DIR               1304         2003           273 74     61.0     -6.9     -1.3
                                                           8.0      5.1
DIR               1304         2002           219 53     28.0      9.2      1.7
                                                           8.0      5.3
DIR               1303         2005             0  0      0.0     -1.3     -0.3
                                                           8.0      4.7
DIR               1303         2004            67  6      7.0      1.3      0.3
                                                           8.0      4.7
DIR               1303         2005             0  0      0.0      2.3      0.4
                                                           8.0      5.3
DIR               1303         2001           160 80     54.0     -0.2     -0.0
                                                           8.0      5.8
DIR               1303         2002           146 69     64.0     -2.1     -0.4
                                                           8.0      4.9
DIR               1302         2001             0  0      0.0      1.2      0.4
                                                           8.0      3.0
DIR               1302         2003           174 24     24.0     -1.2     -0.4
                                                           8.0      3.0
DIR               1302         2004             0  0      0.0     -7.2     -1.9
                                                           8.0      3.8
DIR               1302         2003           333 84     34.0      7.2      1.9
                                                           8.0      3.8
ZANG              1301         2005            98 12     18.0      1.4      0.2
                                                           8.0      7.8
ZANG              1301         2003           104 39     67.0     -9.6     -1.3
                                                           8.0      7.1
ZANG              1301         2005            98 12     21.0      4.4      0.6
                                                           8.0      7.8
ZANG              1301         2002           105 91     85.0      9.1      1.5
                                                           8.0      6.1
ZANG              1303         2005            96 82     93.0      7.9      1.0
                                                           8.0      7.8
ZANG              1303         2005            96 82     83.0     -2.1     -0.3
                                                           8.0      7.8
ZANG              1303         2001            95 60     23.0      4.2      0.6
                                                           8.0      6.9
ZANG              1303         2002            97 64     29.0      0.1      0.0
                                                           8.0      5.5
ZANG              1302         2001            94  8      7.0     -1.5     -0.3
                                                           8.0      5.0
ZANG              1302         2003           102 35     92.0      1.0      0.2
                                                           8.0      6.1
ZANG              1302         2003           102 35     90.0     -1.0     -0.2
                                                           8.0      6.1
DIR               1203         2005             0  0      0.0      1.3      0.3
                                                           8.0      5.4
```

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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                 OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                     STD DEV  STD DEV      PPM
---- ----------- ------------ ------------ ----------------- -------- --------
DIR              1203         2004           67  6      5.0      6.0      1.2
                                                         8.0      5.1
DIR              1203         2002          146 69     70.0     -7.3     -1.6
                                                         8.0      4.6
DIR              1203         2005            0  0      0.0     -1.2     -0.2
                                                         8.0      5.1
DIR              1203         2001          160 80     50.0      1.2      0.2
                                                         8.0      5.1
DIR              1203         2005            0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1201         2005            0  0      0.0      0.6      0.1
                                                         8.0      5.6
DIR              1201         2003          367 53     13.0     -0.1     -0.0
                                                         8.0      6.0
DIR              1201         2002          379 17     98.0     -0.5     -0.1
                                                         8.0      5.5
DIR              1201         2005            0  0      0.0     -0.0     -0.0
                                                         8.0      0.0        *
DIR              1201         2005            0  0      0.0      5.1      1.0
                                                         8.0      5.2
DIR              1201         2004          399 83     34.0     -5.1     -1.0
                                                         8.0      5.2
DIR              1204         2005            0  0      0.0      7.2      1.3
                                                         8.0      5.5
DIR              1204         2001          199 79     16.0      1.2      0.2
                                                         8.0      5.7
DIR              1204         2002          219 53     68.0     -8.5     -1.6
                                                         8.0      5.2
DIR              1204         2005            0  0      0.0     -0.0     -0.0
                                                         8.0      0.0        *
DIR              1204         2005            0  0      0.0      0.8      0.2
                                                         8.0      4.7
DIR              1204         2003          273 74     65.0     -0.8     -0.2
                                                         8.0      4.7
DIR              1204         2005            0  0      0.0     -0.0     -0.0
                                                         8.0      0.0        *
DIR              1204         2005            0  0      0.0     -0.0     -0.0
                                                         8.0      0.0        *
DIR              1205         2001            0  0      0.0     -2.6     -0.4
                                                         8.0      6.9
DIR              1205         2003            6 72     63.0     -5.3     -0.8
                                                         8.0      6.9
DIR              1205         2004            0  4     10.0      1.8      0.3
                                                         8.0      6.9
DIR              1205         6H              2 38     21.0      6.1      0.9
                                                         8.0      6.9
DIR              1205         2203            0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
ZANG             1203         2005           96 82     86.0      0.9      0.1
                                                         8.0      7.8
ZANG             1203         2002           97 64     23.0     -6.1     -1.1
                                                         8.0      5.5
ZANG             1203         2005           96 82     84.0     -1.1     -0.1
                                                         8.0      7.8
ZANG             1203         2001           95 60     13.0     -5.9     -0.8
                                                         8.0      6.9
ZANG             1203         2005           96 82     87.0      1.9      0.2
                                                         8.0      7.8
ZANG             1201         2005           98 12     21.0      3.7      0.5
                                                         8.0      7.8
ZANG             1201         2003          104 39     84.0      3.6      0.5
                                                         8.0      7.1
ZANG             1201         2002          105 91     79.0     -3.5     -0.6
                                                         8.0      6.1
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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                 OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                     STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
ZANG              1201         2005            98 12     23.0      5.7      0.7
                                                          8.0      7.8
ZANG              1201         2005            98 12     24.0      6.7      0.9
                                                          8.0      7.8
ZANG              1205         2001           101 88      1.0      6.3      0.8
                                                          8.0      7.8
ZANG              1205         2003           103 17     36.0      7.8      1.0
                                                          8.0      7.7
DIST              1203         2105                 101.88010  -0.0021  -2.2473
                                                       0.0010   0.0009    20.72
DIST              1203         2204                  11.64160  -0.0002  -0.2442
                                                       0.0010   0.0010    20.28
DIST              1203         2202                  10.16660  -0.0006  -0.5842
                                                       0.0010   0.0010    55.27
DIST              1203         2201                  22.03280  -0.0010  -1.0468
                                                       0.0010   0.0009    44.25
DIST              1201         2105                 120.42210  -0.0032  -3.3533
                                                       0.0010   0.0010    26.99
DIST              1201         2203                  22.03280  -0.0009  -0.9408
                                                       0.0010   0.0009    39.76
DIST              1201         2202                  12.32670   0.0002   0.1645
                                                       0.0010   0.0009    12.64
DIST              1201         2204                  23.88010  -0.0009  -0.9621
                                                       0.0010   0.0009    37.35
DIST              1204         2202                  12.82140  -0.0007  -0.7033
                                                       0.0010   0.0010    52.46
DIST              1204         2203                  11.64220  -0.0007  -0.7223
                                                       0.0010   0.0010    59.90
DIST              1204         2201                  23.88020  -0.0010  -1.1236
                                                       0.0010   0.0009    43.64
DIST              1204         2105                  96.65190  -0.0016  -1.7310
                                                       0.0010   0.0009    16.56
DIST              1205         2203                 101.87910  -0.0011  -1.2077
                                                       0.0010   0.0009    11.10
DIST              1205         2204                  96.65100  -0.0008  -0.8666
                                                       0.0010   0.0009     8.27
ELAT              01           1201             0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    94.79*
ELON              01           1201             0 00  0.000000   0.0001   0.0001
                                                       0.0001   0.0000   369.12*
EHDF              01           1201                    0.24100  -0.0002  -0.6227
                                                       0.0003   0.0003   692.56
ELAT              01           1301             0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000   203.42*
ELON              01           1301             0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    41.25*
EHDF              01           1301                    0.24100  -0.0003  -1.1442
                                                       0.0003   0.0003  1272.89
ELAT              01           2001             0 00  0.000000   0.0001   0.8871
                                                       0.0001   0.0001   253.92
ELON              01           2001             0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000    42.74
EHDF              01           2001                    0.24100   0.0001   0.5077
                                                       0.0003   0.0003   544.48
ELAT              01           2201             0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    13.18
ELON              01           2201             0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    79.78
EHDF              01           2201                    0.24100  -0.0000  -0.0000
                                                       0.0003   0.0000     0.00*
ELAT              02           1302             0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    43.40*
ELON              02           1302             0 00  0.000000  -0.0001  -0.0001
                                                       0.0001   0.0000   226.01*
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================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ----------------- -------- --------
EHDF              02           1302                   0.25000   0.0002   0.7955
                                                       0.0003   0.0003   863.66
ELAT              02           2002           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    38.63*
ELON              02           2002           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000   177.33*
EHDF              02           2002                   0.25000   0.0001   0.4330
                                                       0.0003   0.0003   471.70
ELAT              02           2202           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     4.79
ELON              02           2202           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    48.79
EHDF              02           2202                   0.25000   0.0000   0.0000
                                                       0.0003   0.0000     0.00*
ELAT              3            1203           0 00  0.000000   0.0001   0.0001
                                                       0.0001   0.0000   222.64*
ELON              3            1203           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    40.83*
EHDF              3            1203                   0.23800   0.0004   1.4304
                                                       0.0003   0.0003  1621.64
ELAT              3            1303           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000   104.28*
ELON              3            1303           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    67.63*
EHDF              3            1303                   0.23800   0.0004   1.4197
                                                       0.0003   0.0003  1609.03
ELAT              3            2003           0 00  0.000000  -0.0001  -0.9909
                                                       0.0001   0.0001   275.38
ELON              3            2003           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000   131.14
EHDF              3            2003                   0.23800   0.0002   0.6774
                                                       0.0003   0.0003   753.93
ELAT              3            2203           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000    51.86
ELON              3            2203           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    22.60
EHDF              3            2203                   0.23800  -0.0000  -0.0000
                                                       0.0003   0.0000     0.00*
ELAT              4            1204           0 00  0.000000   0.0001   0.0001
                                                       0.0001   0.0000   412.20*
ELON              4            1204           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000   115.89*
EHDF              4            1204                   0.23800  -0.0006  -2.1679
                                                       0.0003   0.0003  2467.18
ELAT              4            1304           0 00  0.000000  -0.0001  -0.0001
                                                       0.0001   0.0000   575.61*
ELON              4            1304           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    17.26*
EHDF              4            1304                   0.23800  -0.0002  -0.6947
                                                       0.0003   0.0003   789.25
ELAT              4            2004           0 00  0.000000   0.0000   1.2916
                                                       0.0001   0.0000   154.37
ELON              4            2004           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000   125.77
EHDF              4            2004                   0.23800   0.0000   0.0000
                                                       0.0003   0.0000     0.00*
ELAT              4            2204           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     9.60
ELON              4            2204           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000     7.09
EHDF              4            2204                   0.23800   0.0000   0.0000
                                                       0.0003   0.0000     0.00*
ELAT              05           1205           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     8.16
```

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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
ELON              05           1205            0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000    78.76
EHDF              05           1205                   0.23800   0.0001   0.5316
                                                       0.0003   0.0001   257.41
ELAT              05           2005            0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000    10.92
ELON              05           2005            0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000     0.59
EHDF              05           2005                   0.23800  -0.0002  -1.4922
                                                       0.0003   0.0002   966.32
ELAT              05           2105            0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    33.78
ELON              05           2105            0 00  0.000000  -0.0001  -0.0001
                                                       0.0001  -0.0000   289.92
EHDF              05           2105                   0.23800  -0.0000  -0.0000
                                                       0.0003   0.0000     0.00*
ELAT              02           21602S005       0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000     0.00
ELON              02           21602S005       0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000     0.00
EHDF              02           21602S005              0.39100   0.0000   0.0000
                                                       0.0005   0.0000     0.00*
ELAT              02           21602M005       0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     0.00
ELON              02           21602M005       0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     0.00
EHDF              02           21602M005             -0.09500  -0.0000  -0.0000
                                                       0.0005   0.0000     0.00*
EHDF              6000         3                      1.03595   0.0000   0.0000
                                                       0.0001   0.0000     3.75*
EHDF              3            4                      0.16826  -0.0001  -0.0001
                                                       0.0001   0.0000     6.34*
EHDF              4            6000                  -1.20418   0.0000   0.0000
                                                       0.0001   0.0000     3.22*
EHDF              6000         02                     1.40053   0.0000   0.0000
                                                       0.0001   0.0000     3.54*
EHDF              02           6000                  -1.40052  -0.0001  -0.0001
                                                       0.0001   0.0000     4.37*
EHDF              02           01                     1.15356   0.0000   0.0000
                                                       0.0001   0.0000     0.75*
EHDF              01           02                    -1.15352  -0.0000  -0.0000
                                                       0.0001   0.0000     4.00*
EHDF              6000         9100                  11.20930  -0.0006  -2.7067
                                                       0.0003   0.0002     4.91
EHDF              9100         6000                 -11.20906   0.0004   1.6895
                                                       0.0003   0.0002     3.07
EHDF              9101         9003                   6.57295  -0.0001  -0.5708
                                                       0.0003   0.0002    18.78
EHDF              9003         9101                  -6.57284   0.0000   0.0622
                                                       0.0003   0.0002     2.05
EHDF              05           9100                   5.09800   0.0000   0.2020
                                                       0.0002   0.0001     0.90
EHDF              9100         05                    -5.09766  -0.0004  -2.4864
                                                       0.0002   0.0001    11.06
EHDF              9100         9101                   0.01816  -0.0000  -0.0000
                                                       0.0001   0.0000   838.45*
EHDF              9003         21602S004              0.04996  -0.0000  -0.0000
                                                       0.0001   0.0000   304.61*
EHDF              21602S004    09                     0.53720  -0.0004  -1.6222
                                                       0.0005   0.0002   708.50
ELAT              09           21602S004       0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000     0.00
ELON              09           21602S004       0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     0.00
ELAT              7000         WHJF            0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0001     0.00
```

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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                  OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                      STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ----------------- -------- --------
ELON             7000         WHJF           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
EHDF             01           7000                   0.47003  -0.0000  -0.0000
                                                      0.0001   0.0000    18.31*
EHDF             7000         01                    -0.46997  -0.0000  -0.0000
                                                      0.0001   0.0000    18.31*
ELAT             6H           21602M002      0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
ELON             6H           21602M002      0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
EHDF             21602M002    6H                     0.35100   0.0000   0.0000
                                                      0.0003   0.0000         *
DIR              1301         2005             0  0      0.0      2.4      0.5
                                                        8.0      5.1
DIR              1301         6H             390 32     20.0     -2.4     -0.5
                                                        8.0      5.1
DIR              1301         2005             0  0      0.0     -0.5     -0.5
                                                        8.0      1.1
DIR              1301         WHJF           279 91     66.0      0.5      0.5
                                                        8.0      1.1
DIR              1304         2005             0  0      0.0     -0.4     -0.2
                                                        8.0      2.4
DIR              1304         6H             296 40      6.0      0.4      0.2
                                                        8.0      2.4
DIR              1304         2005             0  0      0.0    -12.6     -2.5
                                                        8.0      5.0
DIR              1304         WHJF           203 69     25.0     12.6      2.5
                                                        8.0      5.0
DIR              1303         2005             0  0      0.0     -1.7     -0.4
                                                        8.0      4.1
DIR              1303         6H              57 60     28.0      1.7      0.4
                                                        8.0      4.1
DIR              1303         2005             0  0      0.0     -0.9     -0.2
                                                        8.0      4.8
DIR              1303         WHJF           165 32     15.0      0.9      0.2
                                                        8.0      4.8
DIR              1302         2001             0  0      0.0      3.8      1.0
                                                        8.0      3.7
DIR              1302         WHJF             8 11     16.0     -3.8     -1.0
                                                        8.0      3.7
DIR              1302         2004             0  0      0.0     -2.9     -0.8
                                                        8.0      3.8
DIR              1302         6H             382 12     12.0      2.9      0.8
                                                        8.0      3.8
ZANG             1301         6H              99 13     58.0     -3.7     -0.5
                                                        8.0      7.5
DIST             13017        WHJF                   0.04390   0.0000   0.0000
                                                      0.0001   0.0000     0.91*
EHDF             WHJF         13017                 -0.02650   0.0001   0.0001
                                                      0.0001   0.0000  1225.38*
DIR              WHJF         1301             0  0      0.0      0.0      0.0
                                                        1.0      0.0         *
DIR              WHJF         13017            0  0      0.0     -1.3     -0.5
                                                        8.0      2.4
ZANG             1301         13017           96 89     75.0     -0.8     -1.0
                                                        8.0      0.9
ZANG             1304         6H              71 99     99.0     -3.2     -1.8
                                                        8.0      1.8
DIST             13047        WHJF                   0.04390   0.0000   0.0000
                                                      0.0001   0.0000     0.07*
EHDF             WHJF         13047                 -0.02650  -0.0001  -0.0001
                                                      0.0001   0.0000  1167.23*
DIR              WHJF         1304             0  0      0.0      0.0      0.0
                                                        1.0      0.0         *
DIR              WHJF         13047            0  0      0.0      0.0      0.0
                                                        8.0      0.2
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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                        STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ----------------- -------- --------
ZANG             1304         13047          96 27      9.0     12.6      1.8
                                                         8.0      7.2
ZANG             1303         6H             86 22     11.0      1.6      0.3
                                                         8.0      5.0
DIST             13037        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.78*
EHDF             WHJF         13037                 -0.02650   0.0000   0.0000
                                                        0.0001   0.0000    17.91*
DIR              WHJF         1303            0  0      0.0     -0.0     -0.0
                                                         1.0      0.0         *
DIR              WHJF         13037           0  0      0.0      0.7      0.3
                                                         8.0      2.5
ZANG             1303         13037          95 32     74.0     -0.2     -0.0
                                                         8.0      7.0
DIST             13027        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.02*
EHDF             WHJF         13027                 -0.02650   0.0001   0.0001
                                                        0.0001   0.0000  1298.28*
DIR              WHJF         1302            0  0      0.0     -0.0     -0.0
                                                         1.0      0.0         *
DIR              WHJF         13027           0  0      0.0     -0.0     -0.1
                                                         8.0      0.3
ZANG             1302         13027          93 72     15.0     -7.1     -1.3
                                                         8.0      5.5
ZANG             1302         6H             92 26     29.0     11.5      1.9
                                                         8.0      6.0
DIR              1203         2005            0  0      0.0      0.5      0.1
                                                         8.0      4.1
DIR              1203         6H             57 60     32.0     -0.5     -0.1
                                                         8.0      4.1
DIR              1203         2005            0  0      0.0      0.1      0.0
                                                         8.0      4.8
DIR              1203         WHJF          165 32     18.0     -0.1     -0.0
                                                         8.0      4.8
DIR              1201         2005            0  0      0.0      3.5      0.7
                                                         8.0      5.1
DIR              1201         6H            390 32     22.0     -3.5     -0.7
                                                         8.0      5.1
DIR              1201         2005            0  0      0.0      0.6      0.6
                                                         8.0      1.1
DIR              1201         WHJF          279 92     10.0     -0.6     -0.6
                                                         8.0      1.1
DIR              1204         2005            0  0      0.0      4.5      0.9
                                                         8.0      4.9
DIR              1204         WHJF          203 69     67.0     -4.5     -0.9
                                                         8.0      4.9
DIR              1204         2005            0  0      0.0     -0.2     -0.1
                                                         8.0      2.4
DIR              1204         6H             296 40     11.0      0.2      0.1
                                                         8.0      2.4
DIR              1205         2001            0  0      0.0      4.6      0.8
                                                         8.0      5.6
DIR              1205         WHJF            0 78     71.0     -4.6     -0.8
                                                         8.0      5.6
ZANG             1203         6H             86 22     23.0     13.8      2.7
                                                         8.0      5.0
DIST             12037        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.77*
EHDF             WHJF         12037                 -0.02650   0.0000   0.0000
                                                        0.0001   0.0000   662.78*
DIR              WHJF         1203            0  0      0.0     -0.0     -0.0
                                                         1.0      0.0         *
DIR              WHJF         12037           0  0      0.0      0.7      0.3
                                                         8.0      2.5
ZANG             1203         12037          95 32     67.0     -6.4     -0.9
                                                         8.0      7.0
```

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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0017
================================================================================
Residuals (critical value = 3.764, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ----------------- -------- --------
ZANG              1201         6H              99 13     52.0    -13.5     -1.8
                                                          8.0      7.5
DIST              12017        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.92*
EHDF              WHJF         12017                 -0.02650  -0.0000  -0.0000
                                                        0.0001   0.0000   830.41*
DIR               WHJF         1201             0  0      0.0      0.0      0.0
                                                          1.0      0.0         *
DIR               WHJF         12017            0  0      0.0     -1.2     -0.5
                                                          8.0      2.5
ZANG              1201         12017           96 90     73.0      0.6      0.7
                                                          8.0      0.9
DIST              12047        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.07*
EHDF              WHJF         12047                 -0.02650  -0.0001  -0.0001
                                                        0.0001   0.0000  1197.47*
DIR               WHJF         1204             0  0      0.0      0.0      0.0
                                                          1.0      0.0         *
DIR               WHJF         12047            0  0      0.0      0.0      0.0
                                                          8.0      0.2
ZANG              1204         12047           96 26     99.0     12.9      1.8
                                                          8.0      7.2
ZANG              1204         6H              71 99     55.0     -5.2     -2.9
                                                          8.0      1.8
DIST              12057        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.00*
EHDF              WHJF         12057                 -0.02650  -0.0000  -0.0000
                                                        0.0001   0.0000     9.14*
DIR               WHJF         1205             0  0      0.0     -0.0     -0.0
                                                          1.0      0.0         *
DIR               WHJF         12057            0  0      0.0      0.0      0.0
                                                          8.0      0.1
ZANG              1205         12057          101 83     32.0      0.5      0.1
                                                          8.0      7.8
ZANG              1205         6H             102 12     30.0     -6.3     -0.8
                                                          8.0      7.7
ELAT 01                                  N 30 30 56.091320   0.0001   2.5642
                                                        0.0007   0.0000
ELON 01                                 E114 29 28.553530   0.0002   1.8535
                                                        0.0006   0.0001
EHGT 01                                           71.21720  -0.0015  -6.7575
                                                        0.0016   0.0002
                                                ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
ELAT 05                                  N 30 30 56.418620  -0.0001  -2.0768
                                                        0.0007   0.0000
ELON 05                                 E114 29 24.054950  -0.0003  -1.7690
                                                        0.0006   0.0002
EHGT 05                                           74.77050   0.0017   5.9427
                                                        0.0016   0.0003
                                                ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
ELAT 09                                  N 30 30 56.365630  -0.0001  -1.1747
                                                        0.0007   0.0001
ELON 09                                 E114 29 22.815870  -0.0000  -0.0508
                                                        0.0007   0.0003
EHGT 09                                           87.04670   0.0012   2.0488
                                                        0.0017   0.0006
```

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|                                                                              |
|                  S T A T I S T I C S    S U M M A R Y                        |
|                                                                              |
 ------------------------------------------------------------------------------
|                                    |                                         |
|     Residual Critical Value Type   |               Tau Max                   |
|     Residual Critical Value        |                3.7641                   |
|     Number of Flagged Residuals    |                     2                   |
|     Convergence Criterion          |                0.0001                   |
|     Final Iteration Counter Value  |                     6                   |
|     Confidence Level Used          |               95.0000                   |
|     Estimated Variance Factor      |                1.1577                   |
|     Number of Degrees of Freedom   |                    89                   |
|                                    |                                         |
 ------------------------------------------------------------------------------
|                                                                              |
|                 Chi-Square Test on the Variance Factor:                      |
|                                                                              |
|                  8.8076e-01  <  1.0000  <  1.5903e+00  ?                     |
|                                                                              |
|                            THE TEST PASSES                                   |
|                                                                              |
 ------------------------------------------------------------------------------

 ------------------------------------------------------------------------------
|                                                                              |
| NOTE:  All confidence regions were computed using the following factors:     |
|        ---------------------------------------------------------------      |
|        Variance factor used      =          1.1577                          |
|        1-D expansion factor      =          1.9600                          |
|        2-D expansion factor      =          2.4477                          |
|        3-D expansion factor      =          2.7955                          |
|                                                                              |
|        Note that, for relative confidence regions, precisions are            |
|        computed from the ratio of the major semi-axis and the spatial        |
|        distance between the two stations.                                    |
|                                                                              |
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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0020
================================================================================
2-D and 1-D Station Confidence Regions (95.000 and 95.000 percent):
STATION            MAJOR SEMI-AXIS  AZ     MINOR SEMI-AXIS             VERTICAL
------------ ---------------------- --- ------------------- --------------------
01                          0.0017 171              0.0016               0.0032
02                          0.0018  22              0.0017               0.0032
05                          0.0017 171              0.0016               0.0032
09                          0.0019 165              0.0018               0.0034
21602M002                   0.0018 114              0.0018               0.0033
21602M005                   0.0018  22              0.0018               0.0034
21602S004                   0.0020 165              0.0018               0.0033
21602S005                   0.0018  22              0.0018               0.0034
WHJF                        0.0018 170              0.0016               0.0032


3D Station Confidence Regions (95.000 percent):
STATION         MAJ-SEMI (AZ,VANG)    MED-SEMI (AZ,VANG)    MIN-SEMI (AZ,VANG)
------------ --------------------- --------------------- ---------------------
01               0.0046 (176, 86)      0.0020 (350,  4)      0.0018 ( 80,  0)
02               0.0046 (176, 86)      0.0020 ( 41,  3)      0.0020 (311,  3)
05               0.0046 (176, 86)      0.0020 (351,  4)      0.0018 ( 81,  0)
09               0.0048 (176, 86)      0.0022 (343,  4)      0.0020 ( 73,  1)
21602M002        0.0047 (176, 86)      0.0021 (286,  1)      0.0020 ( 16,  4)
21602M005        0.0049 (176, 86)      0.0020 ( 39,  3)      0.0020 (308,  3)
21602S004        0.0047 (175, 86)      0.0022 (343,  4)      0.0021 ( 73,  1)
21602S005        0.0049 (176, 86)      0.0020 ( 39,  3)      0.0020 (308,  3)
WHJF             0.0046 (176, 86)      0.0020 (349,  4)      0.0018 ( 79,  1)


2-D and 1-D Relative Station Confidence Regions (95.000 and 95.000 percent):
FROM         TO           MAJ-SEMI  AZ MIN-SEMI  VERTICAL     DISTANCE      PPM
------------ ------------ -------- --- -------- --------- ------------ --------
01           02             0.0008  76   0.0003    0.0001      12.3276    66.28
01           05             0.0007 179   0.0006    0.0005     120.4188     5.52
01           09             0.0011 147   0.0010    0.0011     154.0291     6.92
01           21602M002      0.0010  88   0.0006    0.0007      23.9184    42.09
01           21602M005      0.0009  76   0.0004    0.0011      12.3369    69.59
01           21602S004      0.0011 147   0.0010    0.0007     153.9749     7.13
01           21602S005      0.0009  76   0.0004    0.0011      12.2972    69.82
01           WHJF           0.0005 166   0.0002    0.0003       1.6068   302.86
02           05             0.0009  69   0.0007    0.0005     108.9166     8.45
02           09             0.0013  81   0.0011    0.0011     142.5437     8.84
02           21602M002      0.0008  94   0.0006    0.0007      12.1004    62.84
02           21602M005      0.0003   0   0.0003    0.0011       0.0950  2772.36
02           21602S004      0.0013  81   0.0011    0.0007     142.4807     9.03
02           21602S005      0.0003   0   0.0003    0.0011       0.3910   673.59
02           WHJF           0.0008  86   0.0005    0.0003      12.4457    66.35
05           09             0.0011 148   0.0010    0.0010      35.2814    30.41
05           21602M002      0.0010  86   0.0008    0.0008      96.8502    10.62
05           21602M005      0.0010  69   0.0007    0.0011     108.9207     8.79
05           21602S004      0.0011 148   0.0010    0.0006      35.0982    31.48
05           21602S005      0.0010  69   0.0007    0.0011     108.9004     8.79
05           WHJF           0.0008 170   0.0006    0.0005     120.9053     6.83
09           21602M002      0.0014  94   0.0012    0.0012     130.4493    10.57
09           21602M005      0.0013  81   0.0011    0.0015     142.5550     9.03
09           21602S004      0.0003   0   0.0003    0.0009       0.5368   490.62
09           21602S005      0.0013  81   0.0011    0.0015     142.4976     9.03
09           WHJF           0.0012 158   0.0010    0.0011     154.4435     7.57
21602M002    21602M005      0.0008  94   0.0006    0.0013      12.1115    66.44
21602M002    21602S004      0.0014  94   0.0012    0.0009     130.3861    10.76
21602M002    21602S005      0.0008  94   0.0006    0.0013      12.0625    66.71
21602M002    WHJF           0.0010  98   0.0007    0.0007      24.2228    43.01
21602M005    21602S004      0.0013  81   0.0012    0.0012     142.4917     9.22
21602M005    21602S005      0.0004   0   0.0004    0.0015       0.4860   766.39
21602M005    WHJF           0.0009  86   0.0006    0.0011      12.4574    69.57
21602S004    21602S005      0.0013  81   0.0012    0.0012     142.4361     9.22
21602S004    WHJF           0.0012 158   0.0010    0.0007     154.3906     7.76
21602S005    WHJF           0.0009  86   0.0006    0.0011      12.4048    69.87

Tue Jul 12 15:03:50 2005
```

5.10. Jiufeng network covariance matrix

```
*
* Extracted coordinates follow: (extracted on Tue Jul 12 11:23:02 2005)
* Source (GeoLab adjustment): wuhnmet
* Variance factor of adjustment = 1.157748
* Variance factor used in computing covariance matrix = 1.157748
* Number of degrees of freedom of adjustment = 89
* Number of stations in adjusted network = 43
* Number of stations extracted = 9
*
 3DC
 XYZ      21602M002         -2279828.6185       5004706.6944       3219777.5997 m       0
 XYZ      21602S004         -2279714.3814       5004767.3860       3219793.9387 m       0
 XYZ      WHJF              -2279850.6855       5004696.7062       3219777.7521 m       0
 XYZ      01                -2279849.9138       5004695.8814       3219778.8948 m       0
 XYZ      05                -2279739.9102       5004743.7341       3219789.3838 m       0
 XYZ      02                -2279839.2834       5004701.2811       3219775.7628 m       0
 XYZ      21602S005         -2279839.4231       5004701.5876       3219775.9613 m       0
 XYZ      21602M005         -2279839.2495       5004701.2066       3219775.7145 m       0
 XYZ      09                -2279714.5731       5004767.8069       3219794.2113 m       0
 COV  CT UPPR
 ELEM    2.19195062855766e-06    1.25817663369461e-07    1.03861308808104e-06
 ELEM    2.05204689789329e-06      1.037641273846e-07    1.04434904030822e-06
 ELEM    2.07524370404863e-06     1.0772871550176e-07    1.05195328844106e-06
 ELEM    2.06815542643317e-06    1.04241252701936e-07    1.04568274325689e-06
 ELEM    2.05393677773639e-06    1.04820489553297e-07    1.03911900447749e-06
 ELEM    2.08468255061654e-06    1.24706808824495e-07    1.02045417583583e-06
 ELEM    2.08468255061654e-06    1.24706808824495e-07    1.02045417583583e-06
 ELEM    2.08468255061654e-06    1.24706808824495e-07    1.02045417583583e-06
 ELEM    2.04009240057315e-06    1.03764127384859e-07      1.037302919464e-06
 ELEM    5.37333116508263e-07    7.40284049820902e-08    1.045768546203l6e-07
 ELEM    4.46430785060392e-07    1.08593290623268e-07    9.91195100802871e-08
 ELEM    4.78594774879524e-07     1.1933808003509e-07    1.02703009312899e-07
 ELEM    4.67139025275644e-07    1.13463301152902e-07    1.06744429067901e-07
 ELEM    4.51588928458327e-07    1.04981334147137e-07    1.20034834619845e-07
 ELEM    4.99098407209186e-07    8.39360350005728e-08    1.20034834619845e-07
 ELEM    4.99098407209186e-07     8.3936035000573e-08    1.20034834619845e-07
 ELEM    4.99098407209186e-07     8.3936035000573e-08    1.03892482389515e-07
 ELEM    4.46430785060407e-07    1.08189913608616e-07
 ELEM    1.22223003314387e-06    1.04439724304916e-06    1.08304070416647e-07
 ELEM    1.07543843397502e-06    1.05197613755685e-06    1.05273010580719e-07
 ELEM    1.09071731195193e-06    1.04571054625415e-06    1.11188025547355e-07
 ELEM    1.09060953566862e-06    1.03911087261021e-06    1.07703725053025e-07
 ELEM    1.08336881573105e-06      1.020479070643e-06    7.61746849276202e-08
 ELEM    1.13504621912111e-06      1.020479070643e-06    7.61746849276205e-08
 ELEM    1.13504621912111e-06      1.020479070643e-06    7.61746849276204e-08
 ELEM    1.13504621912111e-06     1.0370109637233e-06    1.08304070416807e-07
 ELEM    1.07108487436264e-06
 ELEM    2.15873322371685e-06    1.01582138963183e-07    1.01011475372507e-06
 ELEM    2.05171900717487e-06    1.03741584363215e-07    1.04463975527214e-06
 ELEM    2.04958721320859e-06    1.03664994121569e-07    1.04332830010745e-06
 ELEM    2.06051898570119e-06    1.03974779144996e-07    1.04878721656461e-06
 ELEM    2.05125533864787e-06    1.03718024817488e-07    1.04407259024277e-06
 ELEM    2.05125533864787e-06    1.03718024817488e-07    1.04407259024277e-06
 ELEM    2.05125533864787e-06    1.03718024817488e-07    1.04407259024277e-06
 ELEM    2.12545126308058e-06    1.09546989963686e-07    1.00191173911524e-06
 ELEM    6.00355224279772e-07    1.18361715612237e-07    1.04471581283605e-07
 ELEM    4.45796059509393e-07    1.08711588858451e-07    1.04454015876811e-07
 ELEM    4.45799650126039e-07    1.08772210144173e-07    1.04643925368201e-07
 ELEM    4.48685285279172e-07    1.09208798539573e-07    1.04548383276471e-07
 ELEM    4.46129734310117e-07    1.08576973636975e-07    1.04548383276471e-07
 ELEM    4.46129734310117e-07    1.08576973636976e-07    1.04548383276471e-07
 ELEM    4.46129734310117e-07    1.08576973636976e-07     1.0158213896384e-07
 ELEM     5.8877774368196e-07    1.18361715612524e-07
 ELEM    1.22363838314355e-06    1.04448870075495e-06     1.0832196732657e-07
 ELEM    1.07465980211879e-06    1.04322676689613e-06    1.08236840225708e-07
 ELEM    1.07389023833281e-06    1.04899121413513e-06     1.0879735000035e-07
 ELEM    1.07954328833729e-06     1.0440533830456e-06    1.08307304606397e-07
 ELEM    1.07487240001273e-06     1.0440533830456e-06    1.08307304606397e-07
 ELEM    1.07487240001273e-06     1.0440533830456e-06    1.08307304606397e-07
 ELEM    1.07487240001273e-06    9.97321878782834e-07    1.23056292151331e-07
```

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ELEM    2.07101973444033e-06    1.04512144964647e-07     1.0411477451694e-06
ELEM    2.05055406852901e-06     1.0448683560398e-07    1.04479289911844e-06
ELEM    2.07025414875886e-06    1.06682712447727e-07    1.04476303319667e-06
ELEM    2.07025414875886e-06    9.89006761293202e-08    1.04474280590207e-06
ELEM    2.07025414875886e-06    9.89006761293202e-08    1.04474280590207e-06
ELEM    2.03979367537265e-06    1.03741584363473e-07    1.03761082492604e-06
ELEM    5.00764397112013e-07    1.25392679676566e-07    1.04072442332532e-07
ELEM    4.74052100192253e-07    1.11827454742772e-07    1.05280600369745e-07
ELEM    4.42823052180786e-07    1.07125599720919e-07    9.89006761293201e-08
ELEM    4.83277526565192e-07    1.19975117213027e-07    1.06682712447727e-07
ELEM    4.83277526565193e-07    1.07204456807389e-07    1.06682712447727e-07
ELEM    4.83277526565193e-07    1.07204456807389e-07    1.03795271123617e-07
ELEM    4.45796059509408e-07    1.08312963722836e-07
ELEM    1.11703737351323e-06    1.04119193502438e-06    1.10749208335981e-07
ELEM    1.09851392768591e-06    1.04448438130264e-06    1.08248873670538e-07
ELEM    1.07351574441808e-06    1.04474280590207e-06    1.07204456807389e-07
ELEM    1.09372813224732e-06    1.04476303319667e-06    1.19975117213028e-07
ELEM    1.09372813224732e-06    1.04476303319667e-06    1.19975117213028e-07
ELEM    1.09372813224732e-06    1.03716485672308e-06    1.08321967326729e-07
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ELEM    2.04794334081481e-06    1.04815163989724e-07    1.04288410251605e-06
ELEM    2.07041455781329e-06    1.04501311541665e-07    1.04439401475134e-06
ELEM    2.07041455781329e-06    1.02881434075328e-07     1.0443921062933e-06
ELEM    2.07041455781329e-06    1.02881434075328e-07     1.0443921062933e-06
ELEM    2.03815880538964e-06    1.03664994121817e-07    1.03659226258175e-06
ELEM    4.74028907418799e-07    1.11155040560031e-07    1.04577055075495e-07
ELEM    4.42853394159065e-07    1.07750927547697e-07    1.02881434075328e-07
ELEM    4.70399105293555e-07    1.13493029493438e-07    1.04501311541665e-07
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ELEM    4.70399105293555e-07    1.10900217852156e-07    1.03774694651985e-07
ELEM    4.45799650126054e-07    1.08371810251649e-07
ELEM    1.09931234448486e-06    1.04312249063221e-06    1.07963585927033e-07
ELEM    1.07261110154589e-06     1.0443921062933e-06    1.10900217852156e-07
ELEM    1.09434677803088e-06    1.04439401475135e-06    1.13493029493439e-07
ELEM    1.09434677803088e-06    1.04439401475135e-06    1.13493029493439e-07
ELEM    1.09434677803088e-06    1.03619651611073e-06     1.0823684022586e-07
ELEM    1.06974652611534e-06
ELEM     2.0781965094755e-06     1.0393657774827e-07    1.04223523946942e-06
ELEM    2.05126765923453e-06      1.045050043993e-07    1.04077154134426e-06
ELEM    2.05126765923453e-06    1.06609975126861e-07    1.04067863163596e-06
ELEM    2.05126765923453e-06    1.06609975126861e-07    1.04067863163596e-06
ELEM    2.04682591161605e-06    1.03974779145293e-07     1.0407163581965e-06
ELEM    4.82399249144305e-07    1.11734520304148e-07    1.06609975126861e-07
ELEM    4.47454000490223e-07    1.04993691889649e-07      1.045050043993e-07
ELEM    4.47454000490223e-07     1.0806970604125e-07      1.045050043993e-07
ELEM    4.47454000490223e-07     1.0806970604125e-07    1.03880791547889e-07
ELEM    4.48685285279188e-07    1.08758998520865e-07
ELEM    1.10553970342149e-06    1.04067863163596e-06     1.0806970604125e-07
ELEM    1.07872933964349e-06    1.04077154134426e-06    1.04993691889649e-07
ELEM    1.07872933964349e-06    1.04077154134426e-06    1.04993691889649e-07
ELEM    1.07872933964349e-06    1.04050033811535e-06    1.08797350000534e-07
ELEM    1.07453866648607e-06
ELEM    2.09098517136211e-06    1.25498948354544e-07    1.01521321812787e-06
ELEM    2.09098517136211e-06    1.25498948354544e-07    1.01521321812787e-06
ELEM    2.09098517136211e-06    1.25498948354544e-07    1.01521321812787e-06
ELEM    2.03945774424282e-06    1.03718024817744e-07    1.03711894981583e-06
ELEM    5.22428532189127e-07    7.49593926297373e-08    1.25498948354544e-07
ELEM    5.22428532189128e-07    7.49593926297375e-08    1.25498948354544e-07
ELEM    5.22428532189128e-07    7.49593926297375e-08     1.0387133952117e-07
ELEM    4.46129734310132e-07    1.08177916111684e-07
ELEM    1.14717471671319e-06    1.01521321812787e-06    7.49593926297376e-08
ELEM    1.14717471671319e-06    1.01521321812787e-06    7.49593926297376e-08
ELEM    1.14717471671319e-06    1.03677840756398e-06    1.08307304606555e-07
ELEM    1.07058444419078e-06
ELEM    2.30878074629944e-06    1.25498948316192e-07     1.1367605802272e-06
ELEM    2.09098517136211e-06    1.25498948354544e-07    1.01521321812787e-06
ELEM    2.03945774424282e-06    1.03718024817744e-07    1.03711894981583e-06
ELEM    5.34006012786767e-07    7.49593926071329e-08    1.25498948354544e-07
ELEM    5.22428532189128e-07    7.49593926297378e-08     1.0387133952117e-07
ELEM    4.46129734310132e-07    1.08177916111684e-07
ELEM    1.23039363731448e-06    1.01521321812787e-06    7.49593926297378e-08
ELEM    1.14717471671319e-06    1.03677840756398e-06    1.08307304606555e-07
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 ELEM    1.07058444419078e-06
 ELEM    2.30878074629944e-06    1.25498948316192e-07     1.1367605802272e-06
 ELEM    2.03945774424282e-06    1.03718024817744e-07    1.03711894981583e-06
 ELEM    5.34006012786767e-07    7.49593926071329e-08     1.0387133952117e-07
 ELEM    4.46129734310132e-07    1.08177916111684e-07
 ELEM    1.23039363731448e-06    1.03677840756398e-06    1.08307304606555e-07
 ELEM    1.07058444419078e-06
 ELEM    2.26273393020678e-06    1.09546989960708e-07     1.0828277522678e-06
 ELEM    5.88777743681787e-07    1.23056292149476e-07
 ELEM    1.25762411366649e-06
*
* End of extracted coordinates
*
```

5.11. Global results listing

```
================================================================================
                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0001
================================================================================
Tue Jul 12 15:05:03 2005

Input file:  D:\itrf\surveys\wuhan\calculs\wuhn_final_val\itrf\wuhnitrf.iob
Output file: D:\itrf\surveys\wuhan\calculs\wuhn_final_val\itrf\wuhnitrf.lst
Options file: C:\Program Files\Microsearch\GeoLab\default.gpj
```

PARAMETERS		OBSERVATIONS	
Description	Number	Description	Number
No. of Stations	44	Directions	92
Coord Parameters	124	Distances	22
Free Latitudes	40	Azimuths	0
Free Longitudes	40	Vertical Angles	0
Free Heights	44	Zenithal Angles	39
Fixed Coordinates	8	Angles	0
Astro. Latitudes	0	Heights	0
Astro. Longitudes	0	Height Differences	47
Geoid Records	0	Auxiliary Params.	0
All Aux. Pars.	45	2-D Coords.	0
Direction Pars.	45	2-D Coord. Diffs.	46
Scale Parameters	0	3-D Coords.	21
Constant Pars.	0	3-D Coord. Diffs.	0
Rotation Pars.	0		
Translation Pars.	0		
	---		---
Total Parameters	169	Total Observations	267
Degrees of Freedom =	98		

SUMMARY OF SELECTED OPTIONS

OPTION	SELECTION
Computation Mode	Adjustment
Maximum Iterations	30
Convergence Criterion	0.00010
Residual Rejection Criterion	Tau Max
Confidence Region Types	1D 2D 3D Station Relative
Relative Confidence Regions	All
Variance Factor (VF) Known	Yes
Scale Covariance Matrix With VF	Yes
Scale Residual Variances With VF	No
Force Convergence in Max Iters	No
Distances Contribute To Heights	No
Compute Full Inverse	Yes
Optimize Band Width	Yes
Generate Initial Coordinates	Yes
Re-Transform Obs After 1st Pass	Yes
Geoid Interpolation Method	Bi-Quadratic

```
================================================================================
                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0003
================================================================================
Adjusted PLH Coordinates:
                                LATITUDE         LONGITUDE  ELIP-HEIGHT
 CODE FFF STATION                STD DEV           STD DEV      STD DEV
 ---- --- ------------ ----------------- ----------------- ------------
 PLH  000 01           N 30 30 56.091285 E114 29 28.553641      71.2188 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 02           N 30 30 55.995307 E114 29 28.106847      70.0652 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 05           N 30 30 56.418618 E114 29 24.054975      74.7757 m       0
                                 0.0058            0.0057       0.0076
 PLH  000 09           N 30 30 56.365615 E114 29 22.815918      87.0517 m       0
                                 0.0059            0.0058       0.0076
 PLH  000 1201         N 30 30 56.091284 E114 29 28.553644      71.4597 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 12017        N 30 30 56.042767 E114 29 28.566857      71.5343 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1203         N 30 30 55.796236 E114 29 27.803006      69.9390 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 12037        N 30 30 56.041266 E114 29 28.565926      71.5344 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1204         N 30 30 56.154092 E114 29 27.662401      70.1063 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 12047        N 30 30 56.041823 E114 29 28.565860      71.5343 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1205         N 30 30 56.418618 E114 29 24.054975      75.0137 m       0
                                 0.0058            0.0057       0.0076
 PLH  000 12057        N 30 30 56.041771 E114 29 28.565851      71.5344 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1301         N 30 30 56.091283 E114 29 28.553641      71.4595 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 13017        N 30 30 56.042769 E114 29 28.566856      71.5344 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1302         N 30 30 55.995307 E114 29 28.106845      70.3155 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 13027        N 30 30 56.041530 E114 29 28.565852      71.5344 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1303         N 30 30 55.796235 E114 29 27.803007      69.9390 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 13037        N 30 30 56.041266 E114 29 28.565927      71.5344 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 1304         N 30 30 56.154085 E114 29 27.662400      70.1067 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 13047        N 30 30 56.041823 E114 29 28.565860      71.5343 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2001         N 30 30 56.091286 E114 29 28.553641      71.4600 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2002         N 30 30 55.995307 E114 29 28.106848      70.3154 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2003         N 30 30 55.796232 E114 29 27.803005      69.9388 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2004         N 30 30 56.154091 E114 29 27.662399      70.1069 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2005         N 30 30 56.418618 E114 29 24.054975      75.0134 m       0
                                 0.0058            0.0057       0.0076
 PLH  000 2105         N 30 30 56.418618 E114 29 24.054974      75.0137 m       0
                                 0.0058            0.0057       0.0076
 PLH  000 21602M001    N 30 31 53.949824 E114 21 26.142577      25.8220 m       0
                                 0.0052            0.0052       0.0052
 PLH  000 21602M002    N 30 30 56.038371 E114 29 27.658664      71.4332 m       0
                                 0.0057            0.0056       0.0075
 PLH  000 21602M005    N 30 30 55.995307 E114 29 28.106847      69.9702 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 21602S004    N 30 30 56.365615 E114 29 22.815918      86.5146 m       0
                                 0.0059            0.0058       0.0076
 PLH  000 21602S005    N 30 30 55.995307 E114 29 28.106847      70.4562 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2201         N 30 30 56.091285 E114 29 28.553642      71.4598 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2202         N 30 30 55.995307 E114 29 28.106847      70.3152 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 2203         N 30 30 55.796234 E114 29 27.803006      69.9387 m       0
```

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================================================================================
                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0004
================================================================================
Adjusted PLH Coordinates:
                                LATITUDE         LONGITUDE  ELIP-HEIGHT
 CODE FFF STATION                STD DEV           STD DEV      STD DEV
 ---- --- ------------ ----------------- ----------------- ------------
                                 0.0057            0.0056       0.0076
 PLH  000 2204         N 30 30 56.154089 E114 29 27.662400      70.1069 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 3            N 30 30 55.796234 E114 29 27.803006      69.7007 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 4            N 30 30 56.154089 E114 29 27.662400      69.8689 m       0
                                 0.0057            0.0056       0.0076
 PLH  110 6000         N 30 30 56.038400 E114 29 27.658670      68.6647 m       0
                                 0.0000            0.0000       0.0076
 PLH  000 6H           N 30 30 56.038370 E114 29 27.658662      71.7841 m       0
                                 0.0057            0.0056       0.0076
 PLH  000 7000         N 30 30 56.041662 E114 29 28.567158      71.6888 m       0
                                 0.0057            0.0056       0.0076
 PLH  110 9003         N 30 30 56.365630 E114 29 22.815870      86.4647 m       0
                                 0.0000            0.0000       0.0076
 PLH  110 9100         N 30 30 56.365630 E114 29 22.815870      79.8736 m       0
                                 0.0000            0.0000       0.0076
 PLH  110 9101         N 30 30 56.365630 E114 29 22.815870      79.8918 m       0
                                 0.0000            0.0000       0.0076
 PLH  000 WHJF         N 30 30 56.041662 E114 29 28.567158      71.5609 m       0
                                 0.0057            0.0056       0.0076


Adjusted XYZ Coordinates:
                           X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION               STD DEV            STD DEV            STD DEV
 ---- --- ------------ ----------------- ----------------- -----------------
 XYZ      01               -2279849.9176       5004695.8832       3219778.8954 m       0
                                  0.0060             0.0070             0.0061
 XYZ      02               -2279839.2870       5004701.2830       3219775.7634 m       0
                                  0.0060             0.0070             0.0061
 XYZ      05               -2279739.9123       5004743.7364       3219789.3856 m       0
                                  0.0060             0.0070             0.0061
 XYZ      09               -2279714.5757       5004767.8095       3219794.2128 m       0
                                  0.0061             0.0070             0.0062
 XYZ      1201             -2279850.0037       5004696.0720       3219779.0177 m       0
                                  0.0060             0.0070             0.0061
 XYZ      12017            -2279850.6655       5004696.6749       3219777.7684 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1203             -2279833.1602       5004707.3752       3219770.4180 m       0
                                  0.0060             0.0070             0.0061
 XYZ      12037            -2279850.6526       5004696.7066       3219777.7287 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1204             -2279827.4886       5004703.9681       3219779.9968 m       0
                                  0.0060             0.0070             0.0061
 XYZ      12047            -2279850.6474       5004696.6993       3219777.7434 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1205             -2279739.9973       5004743.9230       3219789.5064 m       0
                                  0.0060             0.0070             0.0062
 XYZ      12057            -2279850.6475       5004696.7002       3219777.7420 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1301             -2279850.0036       5004696.0720       3219779.0176 m       0
                                  0.0060             0.0070             0.0061
 XYZ      13017            -2279850.6655       5004696.6749       3219777.7685 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1302             -2279839.3763       5004701.4792       3219775.8904 m       0
                                  0.0060             0.0070             0.0061
 XYZ      13027            -2279850.6491       5004696.7037       3219777.7357 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1303             -2279833.1602       5004707.3752       3219770.4180 m       0
                                  0.0060             0.0070             0.0061
 XYZ      13037            -2279850.6527       5004696.7065       3219777.7287 m       0
                                  0.0060             0.0070             0.0061
 XYZ      1304             -2279827.4888       5004703.9685       3219779.9968 m       0
                                  0.0060             0.0070             0.0061
 XYZ      13047            -2279850.6474       5004696.6993       3219777.7434 m       0
                                  0.0060             0.0070             0.0061
```

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                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0005
================================================================================
Adjusted XYZ Coordinates:
                          X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION              STD DEV            STD DEV            STD DEV
 ---- --- ------------ ----------------- ----------------- -----------------
 XYZ      2001              -2279850.0037       5004696.0722       3219779.0179 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2002              -2279839.3764       5004701.4791       3219775.8904 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2003              -2279833.1601       5004707.3751       3219770.4178 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2004              -2279827.4888       5004703.9686       3219779.9970 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2005              -2279739.9972       5004743.9228       3219789.5062 m       0
                                   0.0060             0.0070             0.0062
 XYZ      2105              -2279739.9973       5004743.9230       3219789.5064 m       0
                                   0.0060             0.0070             0.0062
 XYZ      21602M001         -2267749.3870       5009154.2720       3221290.6790 m       0
                                   0.0052             0.0052             0.0052
 XYZ      21602M002         -2279828.6219       5004706.6964       3219777.6005 m       0
                                   0.0060             0.0070             0.0061
 XYZ      21602M005         -2279839.2531       5004701.2085       3219775.7152 m       0
                                   0.0060             0.0070             0.0061
 XYZ      21602S004         -2279714.3839       5004767.3884       3219793.9401 m       0
                                   0.0061             0.0070             0.0062
 XYZ      21602S005         -2279839.4267       5004701.5895       3219775.9619 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2201              -2279850.0037       5004696.0721       3219779.0178 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2202              -2279839.3763       5004701.4790       3219775.8903 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2203              -2279833.1600       5004707.3749       3219770.4178 m       0
                                   0.0060             0.0070             0.0061
 XYZ      2204              -2279827.4888       5004703.9686       3219779.9970 m       0
                                   0.0060             0.0070             0.0061
 XYZ      3                 -2279833.0750       5004707.1883       3219770.2969 m       0
                                   0.0060             0.0070             0.0061
 XYZ      4                 -2279827.4038       5004703.7820       3219779.8761 m       0
                                   0.0060             0.0070             0.0061
 XYZ      6000              -2279827.6332       5004704.5255       3219776.1955 m       0
                                   0.0027             0.0059             0.0038
 XYZ      6H                -2279828.7472       5004706.9716       3219777.7787 m       0
                                   0.0060             0.0070             0.0061
 XYZ      7000              -2279850.7351       5004696.8084       3219777.8176 m       0
                                   0.0060             0.0070             0.0061
 XYZ      9003              -2279714.3648       5004767.3496       3219793.9152 m       0
                                   0.0027             0.0059             0.0038
 XYZ      9100              -2279712.0111       5004762.1823       3219790.5684 m       0
                                   0.0027             0.0059             0.0038
 XYZ      9101              -2279712.0175       5004762.1965       3219790.5776 m       0
                                   0.0027             0.0059             0.0038
 XYZ      WHJF              -2279850.6894       5004696.7081       3219777.7526 m       0
                                   0.0060             0.0070             0.0061
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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0007
================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ----------------- -------- --------
XCT  21602M001                                -2267749.38700   0.0000   0.0000
                                                       0.0037   0.0000         *
YCT  21602M001                                 5009154.27200  -0.0000  -0.0000
                                                       0.0055   0.0000         *
ZCT  21602M001                                 3221290.67900  -0.0000  -0.0000
                                                       0.0046   0.0000         *
XCT  WHJF                                     -2279850.69060   0.0017  12.6803
                                                       0.0038   0.0001
                                                       ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
YCT  WHJF                                      5004696.71140   0.0003   0.2598
                                                       0.0067   0.0011
ZCT  WHJF                                      3219777.75270  -0.0031  -2.5292
                                                       0.0062   0.0012
XCT  21602M002                                -2279828.62130  -0.0009 -24.8306
                                                       0.0038   0.0000
                                                       ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
YCT  21602M002                                 5004706.69470  -0.0001  -0.2371
                                                       0.0066   0.0006
ZCT  21602M002                                 3219777.60040   0.0016   2.5733
                                                       0.0061   0.0006
XCT  01                                       -2279849.91420  -0.0009  -5.0994
                                                       0.0038   0.0002
                                                       ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^
YCT  01                                        5004695.88270   0.0029   2.2445
                                                       0.0068   0.0013
ZCT  01                                        3219778.89540   0.0016   1.1052
                                                       0.0063   0.0014
XCT  05                                       -2279739.90990  -0.0002  -0.5211
                                                       0.0038   0.0004
YCT  05                                        5004743.73250   0.0006   0.4496
                                                       0.0068   0.0013
ZCT  05                                        3219789.38310   0.0052   3.6008
                                                       0.0063   0.0014
XCT  02                                       -2279839.28680  -0.0008  -2.4445
                                                       0.0038   0.0003
YCT  02                                        5004701.28130  -0.0005  -0.1613
                                                       0.0073   0.0031
ZCT  02                                        3219775.76340   0.0014   0.4127
                                                       0.0070   0.0034
XCT  09                                       -2279714.57270  -0.0005  -0.5661
                                                       0.0038   0.0009
YCT  09                                        5004767.80580   0.0012   0.6132
                                                       0.0070   0.0020
ZCT  09                                        3219794.21070   0.0051   2.1403
                                                       0.0066   0.0024
DIR              1301         2005             0  0      0.0      1.5      0.3
                                                        8.0      5.2
DIR              1301         2003           367 53     15.0     -1.5     -0.3
                                                        8.0      5.2
DIR              1301         2005             0  0      0.0     -1.0     -0.2
                                                        8.0      5.7
DIR              1301         2004           399 83     14.0      9.3      1.6
                                                        8.0      5.9
DIR              1301         2002           379 18      4.0     -8.3     -1.5
                                                        8.0      5.4
DIR              1304         2005             0  0      0.0     -1.1     -0.2
                                                        8.0      4.8
DIR              1304         2002           219 53     37.0      1.1      0.2
                                                        8.0      4.8
DIR              1304         2005             0  0      0.0     -2.4     -0.5
                                                        8.0      5.1
DIR              1304         2001           199 78     97.0      2.4      0.5
                                                        8.0      5.1
DIR              1304         2005             0  0      0.0     -2.3     -0.4
                                                        8.0      5.6
```

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================================================================================
                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                  OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                      STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
DIR              1304         2003          273 74     61.0     -6.7     -1.3
                                                         8.0      5.1
DIR              1304         2002          219 53     28.0      9.0      1.7
                                                         8.0      5.3
DIR              1303         2005            0  0      0.0     -1.3     -0.3
                                                         8.0      4.7
DIR              1303         2004           67  6      7.0      1.3      0.3
                                                         8.0      4.7
DIR              1303         2005            0  0      0.0      2.2      0.4
                                                         8.0      5.3
DIR              1303         2001          160 80     54.0      0.2      0.0
                                                         8.0      5.8
DIR              1303         2002          146 69     64.0     -2.4     -0.5
                                                         8.0      4.9
DIR              1302         2001            0  0      0.0      1.3      0.4
                                                         8.0      3.0
DIR              1302         2003          174 24     24.0     -1.3     -0.4
                                                         8.0      3.0
DIR              1302         2004            0  0      0.0     -7.3     -1.9
                                                         8.0      3.8
DIR              1302         2003          333 84     34.0      7.3      1.9
                                                         8.0      3.8
ZANG             1301         2005           98 12     18.0      2.5      0.3
                                                         8.0      7.8
ZANG             1301         2003          104 39     67.0     -9.5     -1.3
                                                         8.0      7.1
ZANG             1301         2005           98 12     21.0      5.5      0.7
                                                         8.0      7.8
ZANG             1301         2002          105 91     85.0      9.2      1.5
                                                         8.0      6.1
ZANG             1303         2005           96 82     93.0      9.2      1.2
                                                         8.0      7.8
ZANG             1303         2005           96 82     83.0     -0.8     -0.1
                                                         8.0      7.8
ZANG             1303         2001           95 60     23.0      3.9      0.6
                                                         8.0      6.9
ZANG             1303         2002           97 64     29.0     -0.0     -0.0
                                                         8.0      5.5
ZANG             1302         2001           94  8      7.0     -2.1     -0.4
                                                         8.0      5.0
ZANG             1302         2003          102 35     92.0      1.1      0.2
                                                         8.0      6.1
ZANG             1302         2003          102 35     90.0     -0.9     -0.2
                                                         8.0      6.1
DIR              1203         2005            0  0      0.0      1.2      0.2
                                                         8.0      5.4
DIR              1203         2004           67  6      5.0      6.0      1.2
                                                         8.0      5.1
DIR              1203         2002          146 69     70.0     -7.1     -1.5
                                                         8.0      4.6
DIR              1203         2005            0  0      0.0     -1.6     -0.3
                                                         8.0      5.1
DIR              1203         2001          160 80     50.0      1.6      0.3
                                                         8.0      5.1
DIR              1203         2005            0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1201         2005            0  0      0.0      0.6      0.1
                                                         8.0      5.6
DIR              1201         2003          367 53     13.0      0.2      0.0
                                                         8.0      6.0
DIR              1201         2002          379 17     98.0     -0.8     -0.1
                                                         8.0      5.5
DIR              1201         2005            0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1201         2005            0  0      0.0      5.3      1.0
                                                         8.0      5.2
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                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                  OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                      STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
DIR              1201         2004           399 83     34.0     -5.3     -1.0
                                                         8.0      5.2
DIR              1204         2005             0  0      0.0      7.5      1.4
                                                         8.0      5.5
DIR              1204         2001           199 79     16.0      1.1      0.2
                                                         8.0      5.7
DIR              1204         2002           219 53     68.0     -8.6     -1.6
                                                         8.0      5.2
DIR              1204         2005             0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1204         2005             0  0      0.0      0.8      0.2
                                                         8.0      4.7
DIR              1204         2003           273 74     65.0     -0.8     -0.2
                                                         8.0      4.7
DIR              1204         2005             0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1204         2005             0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
DIR              1205         2001             0  0      0.0     -2.6     -0.4
                                                         8.0      6.9
DIR              1205         2003             6 72     63.0     -5.2     -0.8
                                                         8.0      6.9
DIR              1205         2004             0  4     10.0      1.8      0.3
                                                         8.0      6.9
DIR              1205         6H               2 38     21.0      5.9      0.9
                                                         8.0      6.9
DIR              1205         2203             0  0      0.0      0.0      0.0
                                                         8.0      0.0        *
ZANG             1203         2005            96 82     86.0      2.2      0.3
                                                         8.0      7.8
ZANG             1203         2002            97 64     23.0     -6.3     -1.1
                                                         8.0      5.5
ZANG             1203         2005            96 82     84.0      0.2      0.0
                                                         8.0      7.8
ZANG             1203         2001            95 60     13.0     -6.2     -0.9
                                                         8.0      6.9
ZANG             1203         2005            96 82     87.0      3.2      0.4
                                                         8.0      7.8
ZANG             1201         2005            98 12     21.0      4.8      0.6
                                                         8.0      7.8
ZANG             1201         2003           104 39     84.0      3.6      0.5
                                                         8.0      7.1
ZANG             1201         2002           105 91     79.0     -3.5     -0.6
                                                         8.0      6.1
ZANG             1201         2005            98 12     23.0      6.8      0.9
                                                         8.0      7.8
ZANG             1201         2005            98 12     24.0      7.8      1.0
                                                         8.0      7.8
ZANG             1205         2001           101 88      1.0      5.0      0.6
                                                         8.0      7.8
ZANG             1205         2003           103 17     36.0      6.2      0.8
                                                         8.0      7.7
DIST             1203         2105                 101.88010  -0.0006  -0.6800
                                                      0.0010   0.0009     6.11
DIST             1203         2204                  11.64160  -0.0000  -0.0505
                                                      0.0010   0.0010     4.19
DIST             1203         2202                  10.16660  -0.0004  -0.4060
                                                      0.0010   0.0010    38.42
DIST             1203         2201                  22.03280  -0.0006  -0.6050
                                                      0.0010   0.0009    25.59
DIST             1201         2105                 120.42210  -0.0014  -0.1731
                                                      0.0010   0.0009    11.73
DIST             1201         2203                  22.03280  -0.0005  -0.4845
                                                      0.0010   0.0009    20.49
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Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                  OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                      STD DEV  STD DEV      PPM
---- ----------- ------------ ------------ ----------------- -------- --------
DIST             1201         2202                 12.32670   0.0004   0.4305
                                                       0.0010   0.0009    33.11
DIST             1201         2204                 23.88010  -0.0004  -0.4785
                                                       0.0010   0.0009    18.58
DIST             1204         2202                 12.82140  -0.0005  -0.4843
                                                       0.0010   0.0010    36.14
DIST             1204         2203                 11.64220  -0.0005  -0.5458
                                                       0.0010   0.0010    45.28
DIST             1204         2201                 23.88020  -0.0006  -0.6548
                                                       0.0010   0.0009    25.44
DIST             1204         2105                 96.65190  -0.0002  -0.2116
                                                       0.0010   0.0009     2.00
DIST             1205         2203                101.87910   0.0004   0.3935
                                                       0.0010   0.0009     3.52
DIST             1205         2204                 96.65100   0.0006   0.6765
                                                       0.0010   0.0009     6.35
ELAT             01           1201           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    82.15*
ELON             01           1201           0 00  0.000000   0.0001   0.0001
                                                       0.0001   0.0000   322.67*
EHDF             01           1201                  0.24100  -0.0001  -0.3100
                                                       0.0003   0.0003   344.53
ELAT             01           1301           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000   205.87*
ELON             01           1301           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    75.15*
EHDF             01           1301                  0.24100  -0.0002  -0.8330
                                                       0.0003   0.0003   925.99
ELAT             01           2001           0 00  0.000000   0.0000   0.6918
                                                       0.0001   0.0001   198.45
ELON             01           2001           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001  -0.0000    33.62
EHDF             01           2001                  0.24100   0.0002   0.7975
                                                       0.0003   0.0003   854.63
ELAT             01           2201           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     7.60
ELON             01           2201           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    46.34
EHDF             01           2201                  0.24100  -0.0000  -0.0000
                                                       0.0003   0.0000     0.00*
ELAT             02           1302           0 00  0.000000  -0.0000  -0.0000
                                                       0.0001   0.0000    49.16*
ELON             02           1302           0 00  0.000000  -0.0001  -0.0001
                                                       0.0001   0.0000   238.07*
EHDF             02           1302                  0.25000   0.0002   0.8943
                                                       0.0003   0.0003   970.89
ELAT             02           2002           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    33.48*
ELON             02           2002           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000   171.90*
EHDF             02           2002                  0.25000   0.0001   0.5317
                                                       0.0003   0.0003   579.28
ELAT             02           2202           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000     6.27
ELON             02           2202           0 00  0.000000   0.0000   0.0000
                                                       0.0001  -0.0000    45.36
EHDF             02           2202                  0.25000   0.0000   0.0000
                                                       0.0003   0.0000     0.00*
ELAT             3            1203           0 00  0.000000   0.0001   0.0001
                                                       0.0001   0.0000   220.23*
ELON             3            1203           0 00  0.000000   0.0000   0.0000
                                                       0.0001   0.0000    47.14*
EHDF             3            1203                  0.23800   0.0004   1.4080
                                                       0.0003   0.0003  1596.39
```

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================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                 OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                     STD DEV  STD DEV      PPM
---- ----------- ------------ ------------ ---------------- -------- --------
ELAT             3            1303           0 00  0.000000   0.0000   0.0000
                                                      0.0001   0.0000    84.71*
ELON             3            1303           0 00  0.000000   0.0000   0.0000
                                                      0.0001   0.0000    98.89*
EHDF             3            1303                 0.23800   0.0004   1.3925
                                                      0.0003   0.0003  1578.43
ELAT             3            2003           0 00  0.000000  -0.0001  -1.0050
                                                      0.0001   0.0001   279.28
ELON             3            2003           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000   121.29
EHDF             3            2003                 0.23800   0.0002   0.6478
                                                      0.0003   0.0003   721.12
ELAT             3            2203           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000    25.95
ELON             3            2203           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000    24.89
EHDF             3            2203                 0.23800   0.0000   0.0000
                                                      0.0003   0.0000     0.00*
ELAT             4            1204           0 00  0.000000   0.0001   0.0001
                                                      0.0001   0.0000   395.06*
ELON             4            1204           0 00  0.000000   0.0000   0.0000
                                                      0.0001   0.0000   126.24*
EHDF             4            1204                 0.23800  -0.0006  -2.1210
                                                      0.0003   0.0003  2414.16
ELAT             4            1304           0 00  0.000000  -0.0001  -0.0001
                                                      0.0001   0.0000   582.83*
ELON             4            1304           0 00  0.000000   0.0000   0.0000
                                                      0.0001   0.0000    35.15*
EHDF             4            1304                 0.23800  -0.0002  -0.6520
                                                      0.0003   0.0003   740.84
ELAT             4            2004           0 00  0.000000   0.0000   1.5126
                                                      0.0001   0.0000   182.67
ELON             4            2004           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000   116.18
EHDF             4            2004                 0.23800   0.0000   0.0000
                                                      0.0003   0.0000     0.00*
ELAT             4            2204           0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     5.62
ELON             4            2204           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000    44.87
EHDF             4            2204                 0.23800   0.0000   0.0000
                                                      0.0003   0.0000     0.00*
ELAT             05           1205           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     8.58
ELON             05           1205           0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000    41.62
EHDF             05           1205                 0.23800   0.0000   0.1065
                                                      0.0003   0.0001    51.32
ELAT             05           2005           0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000    12.52
ELON             05           2005           0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     3.55
EHDF             05           2005                 0.23800  -0.0003  -2.1449
                                                      0.0003   0.0002  1375.06
ELAT             05           2105           0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000    10.57
ELON             05           2105           0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000    92.86
EHDF             05           2105                 0.23800   0.0000   0.0000
                                                      0.0003   0.0000     0.00*
ELAT             02           21602S005      0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
ELON             02           21602S005      0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     0.00
```

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================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                  OBSERVATION RESIDUAL  STD RES
TYPE AT          FROM         TO                      STD DEV  STD DEV      PPM
---- ----------- ------------ ----------- ----------------- -------- --------
EHDF             02           21602S005             0.39100  -0.0000  -0.0000
                                                      0.0005   0.0000     0.00*
ELAT             02           21602M005       0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     0.00
ELON             02           21602M005       0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     0.00
EHDF             02           21602M005            -0.09500   0.0000   0.0000
                                                      0.0005   0.0000     0.00*
EHDF             6000         3                     1.03595   0.0000   0.0000
                                                      0.0001   0.0000     3.67*
EHDF             3            4                     0.16826  -0.0001  -0.0001
                                                      0.0001   0.0000     6.20*
EHDF             4            6000                 -1.20418   0.0000   0.0000
                                                      0.0001   0.0000     2.96*
EHDF             6000         02                    1.40053   0.0000   0.0000
                                                      0.0001   0.0000     0.99*
EHDF             02           6000                 -1.40052  -0.0000  -0.0000
                                                      0.0001   0.0000     1.82*
EHDF             02           01                    1.15356  -0.0000  -0.0000
                                                      0.0001   0.0000     2.00*
EHDF             01           02                   -1.15352  -0.0000  -0.0000
                                                      0.0001   0.0000     1.25*
EHDF             6000         9100                 11.20930  -0.0004  -1.5745
                                                      0.0003   0.0002     2.79
EHDF             9100         6000                -11.20906   0.0001   0.5328
                                                      0.0003   0.0002     0.94
EHDF             9101         9003                  6.57295  -0.0001  -0.3271
                                                      0.0003   0.0002    10.58
EHDF             9003         9101                 -6.57284  -0.0000  -0.1902
                                                      0.0003   0.0002     6.15
EHDF             05           9100                  5.09800  -0.0001  -0.4667
                                                      0.0002   0.0001     2.05
EHDF             9100         05                   -5.09766  -0.0003  -1.8472
                                                      0.0002   0.0001     8.11
EHDF             9100         9101                  0.01816  -0.0000  -0.0000
                                                      0.0001   0.0000   178.05*
EHDF             9003         21602S004             0.04996  -0.0000  -0.0000
                                                      0.0001   0.0000    64.69*
EHDF             21602S004    09                    0.53720  -0.0001  -0.0001
                                                      0.0005   0.0000   150.47*
ELAT             09           21602S004       0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
ELON             09           21602S004       0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000     0.00
ELAT             7000         WHJF            0 00  0.000000   0.0000   0.0000
                                                      0.0001   0.0001     0.00
ELON             7000         WHJF            0 00  0.000000  -0.0000  -0.0000
                                                      0.0001  -0.0000     0.00
EHDF             01           7000                  0.47003  -0.0000  -0.0000
                                                      0.0001   0.0000    18.30*
EHDF             7000         01                   -0.46997  -0.0000  -0.0000
                                                      0.0001   0.0000    18.30*
ELAT             6H           21602M002       0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000    41.61
ELON             6H           21602M002       0 00  0.000000   0.0000   0.0000
                                                      0.0001  -0.0000    85.81
EHDF             21602M002    6H                    0.35100  -0.0000  -0.0000
                                                      0.0003   0.0000    32.46*
DIR              1301         2005             0  0      0.0      2.1      0.4
                                                        8.0      5.1
DIR              1301         6H             390 32     20.0     -2.1     -0.4
                                                        8.0      5.1
DIR              1301         2005             0  0      0.0     -0.7     -0.6
                                                        8.0      1.1
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Residuals (critical value = 3.786, N,E,Up for 3D):

NOTE: Observation values shown are reduced to mark-to-mark.

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
DIR		1301	WHJF 279 91	66.0	0.7	0.6
				8.0	1.1	
DIR		1304	2005 0 0	0.0	-0.2	-0.1
				8.0	2.4	
DIR		1304	6H 296 40	6.0	0.2	0.1
				8.0	2.4	
DIR		1304	2005 0 0	0.0	-13.5	-2.7
				8.0	5.0	
DIR		1304	WHJF 203 69	25.0	13.5	2.7
				8.0	5.0	
DIR		1303	2005 0 0	0.0	-2.3	-0.5
				8.0	4.1	
DIR		1303	6H 57 60	28.0	2.3	0.5
				8.0	4.1	
DIR		1303	2005 0 0	0.0	-2.3	-0.5
				8.0	4.8	
DIR		1303	WHJF 165 32	15.0	2.3	0.5
				8.0	4.8	
DIR		1302	2001 0 0	0.0	1.8	0.5
				8.0	3.8	
DIR		1302	WHJF 8 11	16.0	-1.8	-0.5
				8.0	3.8	
DIR		1302	2004 0 0	0.0	-3.6	-0.9
				8.0	3.8	
DIR		1302	6H 382 12	12.0	3.6	0.9
				8.0	3.8	
ZANG		1301	6H 99 13	58.0	-3.7	-0.5
				8.0	7.5	
DIST		13017	WHJF	0.04390	0.0000	0.0000
				0.0001	0.0000	0.91*
EHDF		WHJF	13017	-0.02650	0.0000	0.0000
				0.0001	0.0000	1068.88*
DIR		WHJF	1301 0 0	0.0	-0.0	-0.0
				1.0	0.0	*
DIR		WHJF	13017 0 0	0.0	-1.3	-0.5
				8.0	2.5	
ZANG		1301	13017 96 89	75.0	-0.7	-0.9
				8.0	0.9	
ZANG		1304	6H 71 99	99.0	-3.1	-1.7
				8.0	1.8	
DIST		13047	WHJF	0.04390	0.0000	0.0000
				0.0001	0.0000	0.06*
EHDF		WHJF	13047	-0.02650	-0.0001	-0.0001
				0.0001	0.0000	1148.72*
DIR		WHJF	1304 0 0	0.0	-0.0	-0.0
				1.0	0.0	*
DIR		WHJF	13047 0 0	0.0	0.0	0.0
				8.0	0.2	
ZANG		1304	13047 96 27	9.0	12.4	1.7
				8.0	7.2	
ZANG		1303	6H 86 22	11.0	1.4	0.3
				8.0	5.0	
DIST		13037	WHJF	0.04390	0.0000	0.0000
				0.0001	0.0000	0.78*
EHDF		WHJF	13037	-0.02650	-0.0000	-0.0000
				0.0001	0.0000	11.55*
DIR		WHJF	1303 0 0	0.0	-0.0	-0.0
				1.0	0.0	*
DIR		WHJF	13037 0 0	0.0	0.7	0.3
				8.0	2.5	
ZANG		1303	13037 95 32	74.0	0.1	0.0
				8.0	7.0	
DIST		13027	WHJF	0.04390	0.0000	0.0000
				0.0001	0.0000	0.02*
EHDF		WHJF	13027	-0.02650	0.0001	0.0001
				0.0001	0.0000	1233.78*

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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0008
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Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
DIR               WHJF         1302             0  0      0.0     -0.0     -0.0
                                                           1.0      0.0         *
DIR               WHJF         13027            0  0      0.0     -0.0     -0.1
                                                           8.0      0.3
ZANG              1302         13027           93 72     15.0     -6.8     -1.2
                                                           8.0      5.5
ZANG              1302         6H              92 26     29.0     11.8      2.0
                                                           8.0      6.0
DIR               1203         2005             0  0      0.0     -0.2     -0.1
                                                           8.0      4.1
DIR               1203         6H              57 60     32.0      0.2      0.1
                                                           8.0      4.1
DIR               1203         2005             0  0      0.0     -1.4     -0.3
                                                           8.0      4.8
DIR               1203         WHJF           165 32     18.0      1.4      0.3
                                                           8.0      4.8
DIR               1201         2005             0  0      0.0      3.3      0.7
                                                           8.0      5.1
DIR               1201         6H             390 32     22.0     -3.3     -0.7
                                                           8.0      5.1
DIR               1201         2005             0  0      0.0      0.9      0.9
                                                           8.0      1.1
DIR               1201         WHJF           279 92     10.0     -0.9     -0.9
                                                           8.0      1.1
DIR               1204         2005             0  0      0.0      3.7      0.8
                                                           8.0      4.9
DIR               1204         WHJF           203 69     67.0     -3.7     -0.8
                                                           8.0      4.9
DIR               1204         2005             0  0      0.0      0.2      0.1
                                                           8.0      2.5
DIR               1204         6H             296 40     11.0     -0.2     -0.1
                                                           8.0      2.5
DIR               1205         2001             0  0      0.0      4.4      0.8
                                                           8.0      5.6
DIR               1205         WHJF             0 78     71.0     -4.4     -0.8
                                                           8.0      5.6
ZANG              1203         6H              86 22     23.0     13.6      2.7
                                                           8.0      5.0
DIST              12037        WHJF                    0.04390   0.0000   0.0000
                                                         0.0001   0.0000     0.77*
EHDF              WHJF         12037                  -0.02650   0.0000   0.0000
                                                         0.0001   0.0000   637.51*
DIR               WHJF         1203             0  0      0.0     -0.0     -0.0
                                                           1.0      0.0         *
DIR               WHJF         12037            0  0      0.0      0.7      0.3
                                                           8.0      2.5
ZANG              1203         12037           95 32     67.0     -6.1     -0.9
                                                           8.0      7.0
ZANG              1201         6H              99 13     52.0    -13.4     -1.8
                                                           8.0      7.5
DIST              12017        WHJF                    0.04390   0.0000   0.0000
                                                         0.0001   0.0000     0.92*
EHDF              WHJF         12017                  -0.02650  -0.0000  -0.0000
                                                         0.0001   0.0000   975.10*
DIR               WHJF         1201             0  0      0.0     -0.0     -0.0
                                                           1.0      0.0         *
DIR               WHJF         12017            0  0      0.0     -1.2     -0.5
                                                           8.0      2.5
ZANG              1201         12017           96 90     73.0      0.7      0.8
                                                           8.0      0.9
DIST              12047        WHJF                    0.04390   0.0000   0.0000
                                                         0.0001   0.0000     0.06*
EHDF              WHJF         12047                  -0.02650  -0.0001  -0.0001
                                                         0.0001   0.0000  1176.47*
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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0008
================================================================================
Residuals (critical value = 3.786, N,E,Up for 3D):
NOTE: Observation values shown are reduced to mark-to-mark.
                                                    OBSERVATION RESIDUAL  STD RES
TYPE AT           FROM         TO                       STD DEV  STD DEV      PPM
---- ------------ ------------ ------------ ---------------- -------- --------
DIR               WHJF         1204             0  0      0.0     -0.0     -0.0
                                                           1.0      0.0         *
DIR               WHJF         12047            0  0      0.0      0.0      0.0
                                                           8.0      0.2
ZANG              1204         12047           96 26     99.0     12.7      1.8
                                                           8.0      7.2
ZANG              1204         6H              71 99     55.0     -5.0     -2.8
                                                           8.0      1.8
DIST              12057        WHJF                   0.04390   0.0000   0.0000
                                                        0.0001   0.0000     0.00*
EHDF              WHJF         12057                 -0.02650   0.0000   0.0000
                                                        0.0001   0.0000    14.32*
DIR               WHJF         1205             0  0      0.0      0.0      0.0
                                                           1.0      0.0         *
DIR               WHJF         12057            0  0      0.0      0.0      0.0
                                                           8.0      0.1
ZANG              1205         12057          101 83     32.0     -0.8     -0.1
                                                           8.0      7.8
ZANG              1205         6H             102 12     30.0     -8.0     -1.0
                                                           8.0      7.7


 ------------------------------------------------------------------------------
|                                                                              |
|                   S T A T I S T I C S     S U M M A R Y                      |
|                                                                              |
 ------------------------------------------------------------------------------
|                                    |                                         |
|     Residual Critical Value Type   |               Tau Max                   |
|     Residual Critical Value        |                3.7860                   |
|     Number of Flagged Residuals    |                     3                   |
|     Convergence Criterion          |                0.0001                   |
|     Final Iteration Counter Value  |                     6                   |
|     Confidence Level Used          |               95.0000                   |
|     Estimated Variance Factor      |                1.1941                   |
|     Number of Degrees of Freedom   |                    98                   |
|                                    |                                         |
 ------------------------------------------------------------------------------
|                                                                              |
|                 Chi-Square Test on the Variance Factor:                      |
|                                                                              |
|                  9.1941e-01  <  1.0000  <  1.6141e+00  ?                     |
|                                                                              |
|                            THE TEST PASSES                                   |
|                                                                              |
 ------------------------------------------------------------------------------


 ------------------------------------------------------------------------------
|                                                                              |
| NOTE:  All confidence regions were computed using the following factors:     |
|        ---------------------------------------------------------------      |
|        Variance factor used      =          1.1941                          |
|        1-D expansion factor      =          1.9600                          |
|        2-D expansion factor      =          2.4477                          |
|        3-D expansion factor      =          2.7955                          |
|                                                                              |
|        Note that, for relative confidence regions, precisions are            |
|        computed from the ratio of the major semi-axis and the spatial        |
|        distance between the two stations.                                    |
|                                                                              |
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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0020
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2-D and 1-D Station Confidence Regions (95.000 and 95.000 percent):
STATION            MAJOR SEMI-AXIS  AZ     MINOR SEMI-AXIS             VERTICAL
------------ --------------------- --- ------------------ --------------------
01                          0.0140 171              0.0138               0.0148
02                          0.0140 171              0.0138               0.0148
05                          0.0141 174              0.0138               0.0148
09                          0.0144 165              0.0142               0.0149
21602M001                   0.0128 180              0.0128               0.0103
21602M002                   0.0140 170              0.0138               0.0148
21602M005                   0.0140 171              0.0138               0.0148
21602S004                   0.0144 165              0.0142               0.0148
21602S005                   0.0140 171              0.0138               0.0148
WHJF                        0.0140 170              0.0138               0.0148


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Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0021
================================================================================
3D Station Confidence Regions (95.000 percent):
STATION         MAJ-SEMI (AZ,VANG)    MED-SEMI (AZ,VANG)    MIN-SEMI (AZ,VANG)
------------ --------------------- --------------------- ---------------------
01               0.0211 (175, 86)      0.0160 (350,  4)      0.0158 ( 80,  0)
02               0.0211 (175, 86)      0.0160 (350,  4)      0.0158 ( 80,  0)
05               0.0211 (175, 86)      0.0161 (354,  4)      0.0158 ( 84,  0)
09               0.0212 (175, 85)      0.0164 (344,  4)      0.0162 ( 74,  1)
21602M001        0.0147 (173,  0)      0.0147 ( 76, 86)      0.0147 (263,  4)
21602M002        0.0211 (175, 86)      0.0160 (350,  4)      0.0158 ( 80,  0)
21602M005        0.0212 (175, 86)      0.0160 (350,  4)      0.0158 ( 80,  0)
21602S004        0.0212 (175, 85)      0.0164 (344,  5)      0.0162 ( 74,  1)
21602S005        0.0212 (175, 86)      0.0160 (350,  4)      0.0158 ( 80,  0)
WHJF             0.0211 (175, 86)      0.0160 (349,  4)      0.0158 ( 79,  0)
```

```
================================================================================
                                wuhnitrf.iob
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0022
================================================================================
2-D and 1-D Relative Station Confidence Regions (95.000 and 95.000 percent):
```

FROM	TO	MAJ-SEMI	AZ	MIN-SEMI	VERTICAL	DISTANCE	PPM
01	02	0.0008	76	0.0004	0.0001	12.3279	66.89
01	05	0.0020	4	0.0012	0.0005	120.4207	16.87
01	09	0.0035	147	0.0033	0.0013	154.0307	22.94
01	21602M001	0.0056	171	0.0051	0.0107	12984.050	0.43
01	21602M002	0.0010	87	0.0007	0.0007	23.9188	41.86
01	21602M005	0.0009	76	0.0005	0.0011	12.3371	70.27
01	21602S004	0.0035	147	0.0033	0.0007	153.9764	23.01
01	21602S005	0.0009	76	0.0005	0.0011	12.2975	70.49
01	WHJF	0.0005	166	0.0002	0.0003	1.6069	300.13
02	05	0.0019	9	0.0011	0.0005	108.9182	17.13
02	09	0.0035	142	0.0033	0.0013	142.5450	24.67
02	21602M001	0.0056	171	0.0051	0.0107	12972.654	0.43
02	21602M002	0.0008	92	0.0006	0.0007	12.1006	62.42
02	21602M005	0.0003	0	0.0003	0.0011	0.0950	2815.59
02	21602S004	0.0035	142	0.0033	0.0007	142.4820	24.75
02	21602S005	0.0003	0	0.0003	0.0011	0.3910	684.09
02	WHJF	0.0008	84	0.0005	0.0003	12.4459	66.46
05	09	0.0036	157	0.0033	0.0012	35.2812	103.22
05	21602M001	0.0059	175	0.0052	0.0107	12863.880	0.46
05	21602M002	0.0017	7	0.0011	0.0008	96.8517	17.54
05	21602M005	0.0019	9	0.0012	0.0012	108.9224	17.30
05	21602S004	0.0037	157	0.0034	0.0006	35.0979	104.04
05	21602S005	0.0019	9	0.0012	0.0012	108.9020	17.31
05	WHJF	0.0020	4	0.0012	0.0005	120.9072	16.95
09	21602M001	0.0066	165	0.0060	0.0107	12831.454	0.51
09	21602M002	0.0035	138	0.0033	0.0014	130.4505	26.99
09	21602M005	0.0035	142	0.0033	0.0016	142.5563	24.74
09	21602S004	0.0003	0	0.0003	0.0011	0.5371	497.99
09	21602S005	0.0035	142	0.0033	0.0016	142.4989	24.75
09	WHJF	0.0035	148	0.0033	0.0013	154.4451	22.96
21602M001	21602M002	0.0056	171	0.0051	0.0106	12960.642	0.43
21602M001	21602M005	0.0056	171	0.0051	0.0107	12972.654	0.44
21602M001	21602S004	0.0066	165	0.0060	0.0107	12831.451	0.51
21602M001	21602S005	0.0056	171	0.0051	0.0107	12972.656	0.44
21602M001	WHJF	0.0056	170	0.0051	0.0107	12984.619	0.43
21602M002	21602M005	0.0008	92	0.0007	0.0013	12.1117	66.16
21602M002	21602S004	0.0035	138	0.0033	0.0010	130.3872	27.08
21602M002	21602S005	0.0008	92	0.0007	0.0013	12.0626	66.42
21602M002	WHJF	0.0010	98	0.0007	0.0007	24.2232	42.31
21602M005	21602S004	0.0035	142	0.0033	0.0013	142.4929	24.82
21602M005	21602S005	0.0004	0	0.0004	0.0015	0.4860	778.34
21602M005	WHJF	0.0009	84	0.0006	0.0011	12.4577	69.78
21602S004	21602S005	0.0035	142	0.0033	0.0013	142.4373	24.83
21602S004	WHJF	0.0036	148	0.0033	0.0007	154.3921	23.04
21602S005	WHJF	0.0009	84	0.0006	0.0011	12.4050	70.08

Tue Jul 12 15:05:05 2005

5.12. Global covariance matrix

```
*
* Extracted coordinates follow: (extracted on Tue Jul 12 11:44:34 2005)
* Source (GeoLab adjustment): wuhnitrf
* Variance factor of adjustment = 1.194134
* Variance factor used in computing covariance matrix = 1.194134
* Number of degrees of freedom of adjustment = 98
* Number of stations in adjusted network = 44
* Number of stations extracted = 6
*
 3DC
 XYZ      WUHN 21602M001    -2267749.3870       5009154.2720       3221290.6790 m       0
 XYZ      WHJF 21602M003    -2279850.6894       5004696.7081       3219777.7526 m       0
 XYZ      EGNO 21602M002    -2279828.6219       5004706.6964       3219777.6005 m       0
 XYZ      7231 21602S004    -2279714.3839       5004767.3884       3219793.9401 m       0
 XYZ      JIUB 21602S005    -2279839.4267       5004701.5895       3219775.9619 m       0
 XYZ      DORM 21602M005    -2279839.2531       5004701.2085       3219775.7152 m       0
 COV  CT UPPR
 ELEM    2.74650678715504e-05   -1.29415458288312e-12    1.17680784214991e-13
 ELEM    2.74624988821848e-05   -8.91368517200959e-10   -6.55797209455981e-08
 ELEM    2.74624676888471e-05   -8.92336925791975e-10   -6.55263932825491e-08
 ELEM    2.74622407999274e-05   -9.07919416280792e-10   -6.51295995860531e-08
 ELEM    2.74624784633023e-05   -2.72283540046906e-09    6.71027426412334e-08
 ELEM    2.74624784633024e-05   -2.72283540046505e-09    6.71027426412029e-08
 ELEM    2.74650702959201e-05    2.12844909716792e-12   -2.70743041451749e-09
 ELEM    2.74642176061872e-05   -3.83419330409032e-08   -2.73870259521571e-09
 ELEM     2.7464215766913e-05    -3.8290009696634e-08   -2.88927594328131e-09
 ELEM    2.74641991268312e-05   -3.80235715307765e-08   -8.96926427792818e-10
 ELEM    2.74642166637241e-05    3.83583338242386e-08   -8.96926427793924e-10
 ELEM    2.74642166637241e-05    3.83583338242396e-08
 ELEM    2.74650679769433e-05    6.71142486164583e-08    3.83930593855471e-08
 ELEM    2.74684171237726e-05     6.7100279390477e-08    3.83291658970118e-08
 ELEM    2.74684460926973e-05    6.69530639546179e-08    3.79626672726644e-08
 ELEM    2.74686675828638e-05   -6.55498194856049e-08   -3.83152806573389e-08
 ELEM    2.74684319163501e-05   -6.55498194855966e-08   -3.83152806573258e-08
 ELEM    2.74684319163501e-05
 ELEM    4.98300669868125e-05    1.12822557448264e-06    1.13150350542518e-05
 ELEM    4.97433903964324e-05    1.12007167289763e-06    1.13302065244419e-05
 ELEM    4.98126498946272e-05    1.13435973283024e-06    1.13362061230734e-05
 ELEM     4.9811310084473e-05    1.12244750134001e-06    1.13382955540424e-05
 ELEM     4.9811310084473e-05    1.12244750134001e-06    1.13382955540424e-05
 ELEM     3.2474910075803e-05    1.19414559102699e-06     1.1203203530643e-06
 ELEM    3.24079709959092e-05    1.20734007643634e-06    1.12894867144643e-06
 ELEM     3.2426827150964e-05    1.19237263846467e-06    1.11967453411967e-06
 ELEM    3.24431692313671e-05    1.20843886239653e-06    1.11967453411967e-06
 ELEM    3.24431692313671e-05    1.20843886239654e-06
 ELEM    3.93078540929108e-05    1.13314641087706e-05     1.2076541106082e-06
 ELEM    3.92053253921224e-05    1.13338738050903e-05    1.18483733848847e-06
 ELEM     3.9270576428849e-05    1.13390785221657e-05    1.20391150275475e-06
 ELEM    3.92637626462813e-05    1.13390785221657e-05    1.20391150275477e-06
 ELEM    3.92637626462812e-05
 ELEM    4.97857310579454e-05    1.12420432391415e-06    1.13235821552254e-05
 ELEM     4.9750874839006e-05    1.11719834284956e-06    1.13217189922068e-05
 ELEM    4.97522701365386e-05     1.1230303973036e-06    1.13195901197147e-05
 ELEM    4.97522701365386e-05    1.12303039730361e-06    1.13195901197146e-05
 ELEM    3.24408594090032e-05    1.20124777567198e-06    1.11953023674013e-06
 ELEM    3.24316201693524e-05    1.20898934911523e-06    1.12426624766885e-06
 ELEM    3.24235287557101e-05    1.20050374320445e-06    1.12426624766885e-06
 ELEM    3.24235287557101e-05    1.20050374320445e-06
 ELEM    3.92575507140452e-05      1.132131782185e-05    1.21179691438806e-06
 ELEM    3.92251919279976e-05    1.13190095681177e-05    1.20278118619488e-06
 ELEM    3.92277987993757e-05    1.13190095681177e-05    1.20278118619489e-06
 ELEM    3.92277987993757e-05
 ELEM    5.04133398245337e-05    1.06784779092144e-06    1.05330513168988e-05
 ELEM    4.98165184875274e-05    1.12218057796865e-06    1.13462462813648e-05
 ELEM    4.98165184875274e-05    1.12218057796866e-06    1.13462462813648e-05
 ELEM    3.42720726829111e-05    1.30957331444599e-06     1.1213029818457e-06
 ELEM    3.24338763156966e-05    1.20557375361016e-06     1.1213029818457e-06
 ELEM    3.24338763156966e-05    1.20557375361017e-06
 ELEM    4.07682244347014e-05    1.13447194584615e-05    1.20597608753826e-06
 ELEM    3.92640991078423e-05    1.13447194584616e-05    1.20597608753827e-06
```

```
 ELEM    3.92640991078423e-05
 ELEM    5.00565945799558e-05    1.12927276652434e-06    1.14539508502647e-05
 ELEM     4.9831965823722e-05    1.12927276656361e-06    1.13285770728865e-05
 ELEM    3.24851850870395e-05    1.19218971317529e-06    1.12927276656362e-06
 ELEM     3.2473243751797e-05    1.19218971319846e-06
 ELEM    3.93823924784885e-05    1.13285770728864e-05    1.19218971319844e-06
 ELEM    3.92965465184176e-05
 ELEM    5.00565945799559e-05    1.12927276652435e-06    1.14539508502646e-05
 ELEM    3.24851850870395e-05    1.19218971317531e-06
 ELEM    3.93823924784885e-05
*
* End of extracted coordinates
*
```

5.13. IGS/NGS elevation-dependent phase center models

```
ASHTECH         ASH700936E            (no radom)                  (  0) 96/06/30
       0.0       0.0     110.0
   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       0.0       0.0     128.0
   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0

NOV503+CR       SPKE GPS-503 L1/L2, choke rings,radome         NGS (  2) 00/08/22
       2.0      -2.6      87.1
    .0   -.1    .5   1.4   2.4   3.4   4.4   5.1   5.6   5.6
   5.5   5.0   4.2   3.3   2.4   1.5    .9    .0    .0
       -.8       -.2      94.6
    .0  -1.1  -1.7  -1.9  -1.8  -1.5  -1.3  -1.0   -.8   -.8
   -.9   -.9  -1.1  -1.1   -.9   -.5    .5    .0    .0

JPSREGANT_DD_E       Regant dual depth choke rings, External   NGS (  1) 99/04/07
       1.1        .2     113.1
    .0    .5   1.3   2.1   3.0   3.8   4.6   5.2   5.6   5.8
   5.8   5.5   5.0   4.3   3.4   2.3   1.1    .0    .0
       1.0       1.3     118.6
    .0   -.2    .0    .4   1.0   1.6   2.1   2.5   2.7   2.8
   2.7   2.3   1.9   1.3    .7    .2   -.2    .0    .0

LEICA           LEIAT504                                          (  2) 99/02/05
        .3       -.3     109.3
    .0    .0   -.1   -.1    .0    .0    .0    .1    .1    .1
    .1    .2    .2    .3    .4    .5    .6    .0    .0
       1.1       1.1     128.2
    .0   -.1   -.1   -.1    .0    .0    .0    .0    .0   -.1
   -.2   -.2   -.3   -.3   -.2   -.1    .3    .0    .0
```

5.14. Equipment and observations

Point 5: heavy tripod for temporary point during GPS observations

Point 3: Heavy tripod for temporary point during topometric measurements

Point 1: platform for temporary point during GPS observations

Point 1: platform for temporary point during topometric measurements

Direct levelling for Jiufeng network between DORIS pier and point 1.

5.15. SINEX file : 21602_IGN_2003-342.SNX

```
%=SNX 1.00 IGN 05:193:00000 IGN 03:342:00000 03:342:00000 C 00018
*-------------------------------------------------------------------------------
+FILE/COMMENT
* File created by geotosnx software (Z.Altamimi)
* Original input file: wuhnitrf.cov
* Matrix Scalling Factor used:         1.0000000000
-FILE/COMMENT
*-------------------------------------------------------------------------------
+SITE/ID
*CODE PT __DOMES__ T _STATION DESCRIPTION__ APPROX_LON_ APPROX_LAT_ _APP_H_
 WUHN  A 21602M001   21602M001              114 21 26.1  30 31 53.9    25.8
 WHJF  A 21602M003   21602M003              114 29 28.5  30 30 56.0    71.6
 EGNO  A 21602M002   21602M002              114 29 27.6  30 30 56.0    71.4
 7231  A 21602S004   21602S004              114 29 22.8  30 30 56.3    86.5
 JIUB  A 21602S005   21602S005              114 29 28.1  30 30 55.9    70.5
 DORM  A 21602M005   21602M005              114 29 28.1  30 30 55.9    70.0
-SITE/ID
*-------------------------------------------------------------------------------
+SITE/ECCENTRICITY
*                                          UP______ NORTH___ EAST____
*SITE PT SOLN T DATA_START__ DATA_END____ AXE ARP->BENCHMARK(M)_________
 WUHN  A    1 P 03:340:00000 03:346:86369 UNE   2.3610  -0.0094  -0.0022
 WHJF  A    1 P 03:340:00000 03:345:86369 UNE    .0000    .0000    .0000
 EGNO  A    1 P 03:341:00000 03:346:86369 UNE    .0000    .0000    .0000
-SITE/ECCENTRICITY
*-------------------------------------------------------------------------------
+SOLUTION/EPOCHS
*Code PT SOLN T Data_start__ Data_end____ Mean_epoch__
-SOLUTION/EPOCHS
*-------------------------------------------------------------------------------
+SOLUTION/ESTIMATE
*INDEX TYPE__ CODE PT SOLN _REF_EPOCH__ UNIT S __ESTIMATED VALUE____ _STD_DEV___
     1 STAX   WUHN  A    1 03:342:00000 m    2 -.226774938700000E+07 0.52407E-02
     2 STAY   WUHN  A    1 03:342:00000 m    2 0.500915427200000E+07 0.52407E-02
     3 STAZ   WUHN  A    1 03:342:00000 m    2 0.322129067900000E+07 0.52407E-02
     4 STAX   WHJF  A    1 03:342:00000 m    2 -.227985068940000E+07 0.70590E-02
     5 STAY   WHJF  A    1 03:342:00000 m    2 0.500469670810000E+07 0.56987E-02
     6 STAZ   WHJF  A    1 03:342:00000 m    2 0.321977775260000E+07 0.62696E-02
     7 STAX   EGNO  A    1 03:342:00000 m    2 -.227982862190000E+07 0.70559E-02
     8 STAY   EGNO  A    1 03:342:00000 m    2 0.500470669640000E+07 0.56957E-02
     9 STAZ   EGNO  A    1 03:342:00000 m    2 0.321977760050000E+07 0.62656E-02
    10 STAX   7231  A    1 03:342:00000 m    2 -.227971438390000E+07 0.71002E-02
    11 STAY   7231  A    1 03:342:00000 m    2 0.500476738840000E+07 0.58542E-02
    12 STAZ   7231  A    1 03:342:00000 m    2 0.321979394010000E+07 0.63850E-02
    13 STAX   JIUB  A    1 03:342:00000 m    2 -.227983942670000E+07 0.70751E-02
    14 STAY   JIUB  A    1 03:342:00000 m    2 0.500470158950000E+07 0.56996E-02
    15 STAZ   JIUB  A    1 03:342:00000 m    2 0.321977596190000E+07 0.62755E-02
    16 STAX   DORM  A    1 03:342:00000 m    2 -.227983925310000E+07 0.70751E-02
    17 STAY   DORM  A    1 03:342:00000 m    2 0.500470120850000E+07 0.56996E-02
    18 STAZ   DORM  A    1 03:342:00000 m    2 0.321977571520000E+07 0.62755E-02
-SOLUTION/ESTIMATE
*-------------------------------------------------------------------------------
+SOLUTION/MATRIX_ESTIMATE L COVA
*PARA1 PARA2 ____PARA2+0__________ ____PARA2+1__________ ____PARA2+2__________
     1     1 0.274650678715504E-04
     2     1 -.129415458288312E-11 0.274650702959201E-04
     3     1 0.117680784214991E-12 0.212844909716792E-11 0.274650679769433E-04
     4     1 0.274624988821848E-04 -.270743041451749E-08 0.671142486164583E-07
     4     4 0.498300669868125E-04
     5     1 -.891368517200959E-09 0.274642176061872E-04 0.383930593855471E-07
     5     4 0.112822557448264E-05 0.324749100758030E-04
     6     1 -.655797209455981E-07 -.383419330409032E-07 0.274684171237726E-04
     6     4 0.113150350542518E-04 0.119414559102699E-05 0.393078540929108E-04
     7     1 0.274624676888471E-04 -.273870259521571E-08 0.671002793904770E-07
     7     4 0.497433903964324E-04 0.112032035306430E-05 0.113314641087706E-04
     7     7 0.497857310579454E-04
     8     1 -.892336925791975E-09 0.274642157669130E-04 0.383291658970118E-07
     8     4 0.112007167289763E-05 0.324079709959092E-04 0.120765411060820E-05
     8     7 0.112420432391415E-05 0.324408594090032E-04
     9     1 -.655263932825491E-07 -.382900096966340E-07 0.274684460926973E-04
```

```
     9     4 0.113302065244419E-04 0.120734007643634E-05 0.392053253921224E-04
     9     7 0.113235821552254E-04 0.120124777567198E-05 0.392575507140452E-04
    10     1 0.274622407999274E-04 -.288927594328131E-08 0.669530639546179E-07
    10     4 0.498126498946272E-04 0.112894867144643E-05 0.113338738050903E-04
    10     7 0.497508748390060E-04 0.111953023674013E-05 0.113213178218500E-04
    10    10 0.504133398245337E-04
    11     1 -.907919416280792E-09 0.274641991268312E-04 0.379626672726644E-07
    11     4 0.113435973283024E-05 0.324268271509640E-04 0.118483733848847E-05
    11     7 0.111719834284956E-05 0.324316201693524E-04 0.121179691438806E-05
    11    10 0.106784779092144E-05 0.342720726829111E-04
    12     1 -.651295995860531E-07 -.380235715307765E-07 0.274686675828638E-04
    12     4 0.113362061230734E-04 0.119237263846467E-05 0.392705764288490E-04
    12     7 0.113217189922068E-04 0.120898934911523E-05 0.392251919279976E-04
    12    10 0.105330513168988E-04 0.130957331444599E-05 0.407682244347014E-04
    13     1 0.274624784633023E-04 -.896926427792818E-09 -.655498194856049E-07
    13     4 0.498113100844730E-04 0.111967453411967E-05 0.113390785221657E-04
    13     7 0.497522701365386E-04 0.112426624766885E-05 0.113190095681177E-04
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    14     4 0.112244750134001E-05 0.324431692313671E-04 0.120391150275475E-05
    14     7 0.112303039730360E-05 0.324235287557101E-04 0.120278118619488E-05
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-SOLUTION/MATRIX_ESTIMATE L COVA
%ENDSNX
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