SERVICE
DE GEODESIE
ET NIVELLEMENT

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CIBINONG LOCAL TIE SURVEY (INDONESIA)

October 2015

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Rattachement; ITRF; DORIS; GNSS; REGINA; Cibinong; Indonésie; BIG

Résumé

L'ITRF2014 (dernière réalisation de l'International Terrestrial Reference System) menée par le Laboratoire de Recherche en Géodésie (LAREG) de l'IGN est le résultat de la combinaison des référentiels terrestres issus des quatre techniques de géodésie spatiale (c'est à dire GNSS, SLR, DORIS et VLBI). La fabrication de ce repère nécessite l'ajout dans la combinaison des résultats de rattachement sur des sites co-localisés. Le présent rapport décrit le rattachement de précision réalisé en octobre 2015 sur le site de Cibinong en Indonésie et les résultats obtenus.

The ITRF2014 (latest) realization of the International Terrestrial Reference System computed by the Laboratoire de Recherche en Geodesie (LAREG) at IGN is the result of the combination of reference frame from four space geodesy techniques (i.e. DORIS, GNSS, SLR and VLBI). One way to realize one common frame consists in adding results in the combination from local ties at co-location sites. This report describes the local tie survey carried out in October 2015, following the installation of the GNSS station at Cibinong Indonesia.

Matériel

Système d'exploitation	**Logiciel**
Ubuntu 16.04	LibreOffice Writer 5.1.4.2

Validation

	Fonction	**Nom**	**Visa**
Commanditaire	Chef de département RSI	Bruno Garayt	Signé – 07/09/2016
Rédacteur	Opérateur	Kévin Eyermann	Signé – 29/11/2016
Lecteur	Responsable de production	Jean-Claude Poyard	Signé – 31/08/2016
Approbateur	Chef de service	Thierry Person	Signé – 02/10/2016
Vérificateur	Responsable qualité	Bruno Garayt	Signé – 06/12/2016

Diffusion

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1. INTRODUCTION

The International Terrestrial Reference Frame is the result of a combination of different terrestrial reference frames provided by the four space geodetic techniques (i.e. GNSS, SLR, DORIS and VLBI). 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 tie vectors between their reference points have been surveyed in three dimensions.

The local ties survey accuracy as stated by GGOS should reach 1 mm.

As soon as a REGINA or DORIS site is co-located, a local tie is carried out by IGN with the triple purpose :

- Assign coordinates to the reference point of a new instrument reference point ;
- Provide tie vector coordinates between instruments reference points (i.e. DORIS, GNSS and other space geodetic technique and tide gauge when available) ;
- Produce a local tie SINEX file to the ITRF producer.

The local tie survey has been carried out from the 6th to the 15th of October 2015, with the friendly cooperation of Thierry Lawrence (Telespazio).

2. ACKNOWLEDGEMENTS

On behalf of CNES and IGN, we would like to acknowledge the administrator of the Badan Informasi Geospasial (BIG), M. Arief Syafi'i, for the welcome given to us. In particular, we would like to acknowledge all the team of the geodesy branch for its hospitality and its important technical support.

3. HISTORY

June 1981

Installation of the IGS antenna (**BAKO**).

September 1992

Installation of the DORIS antenna **CIBB** and local tie survey by GNSS technique

December 2000

Removal of the DORIS antenna **CIBB**. Installation of the DORIS antenna **CICB** and local tie survey.

January 2009

Removal of the DORIS antenna **CICB**. Installation of the DORIS antenna **CIDB** and local tie survey.

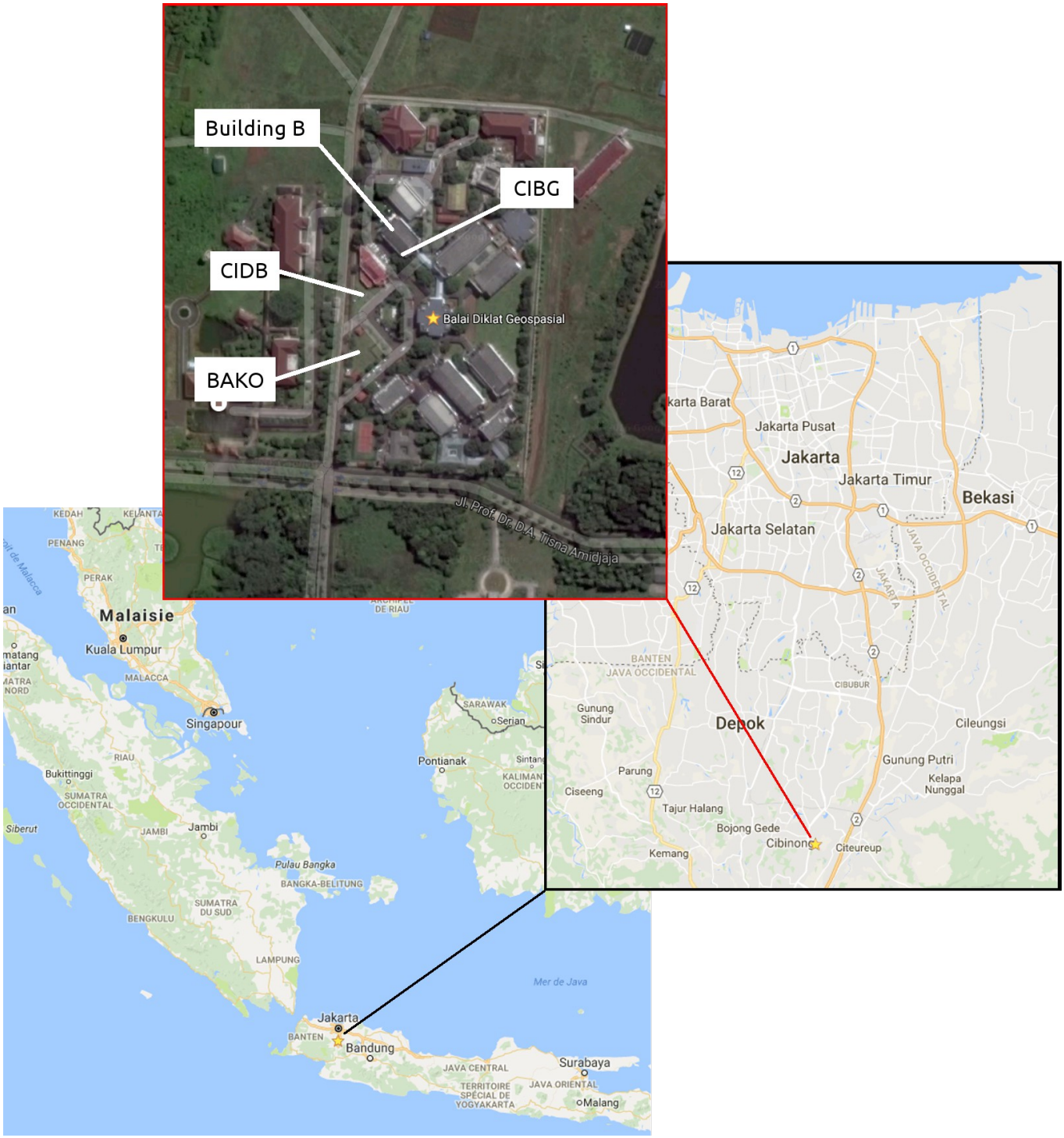
October 2015

Regina station **CIBG** installation and local tie survey with the DORIS and IGS GNSS stations.

4. CO-LOCATED SITE DESCRIPTION

4.1. Site description

The BIG main office is located in Cibinong, less than twenty kilometers south Jakarta center.

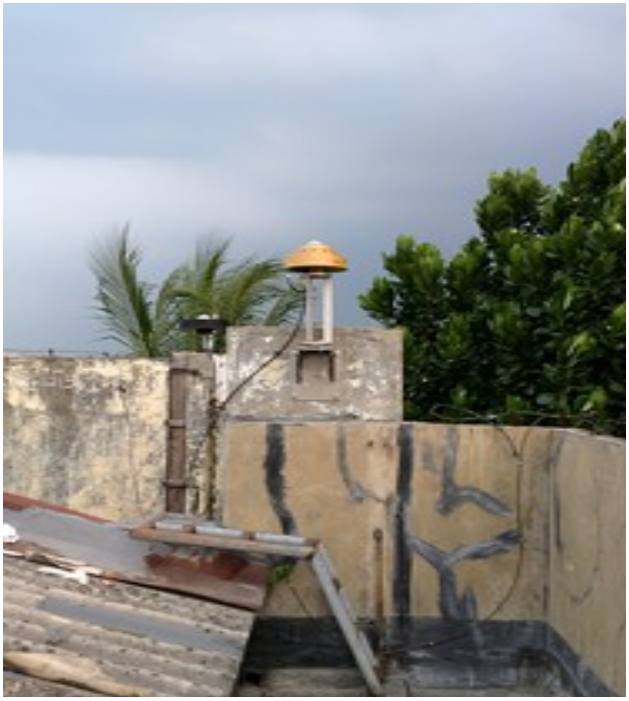


4.2. Co-located points description

Space Geodetic Technique	Acronym	DOMES number	Antenna type / Support	Period
DORIS	CIDB	23101S003	Starec 52291 type *(S/N : 119)* Pillar supported by pyramidal basement 2.5 m deep (1.6 x1.6 m pyramid base dimension)	From January 2009 till now
GNSS	BAKO	23101M002	LEIAT504GG LEIS Permanent tripod (stainless-steel) above the pillar. Concrete Pillar, 50 cm above ground surface.	From June 1981 till now
GNSS	CIBG	23101M005	LEIAR25 NONE / Steel tripod mount on a bracket	From October 2015 till now

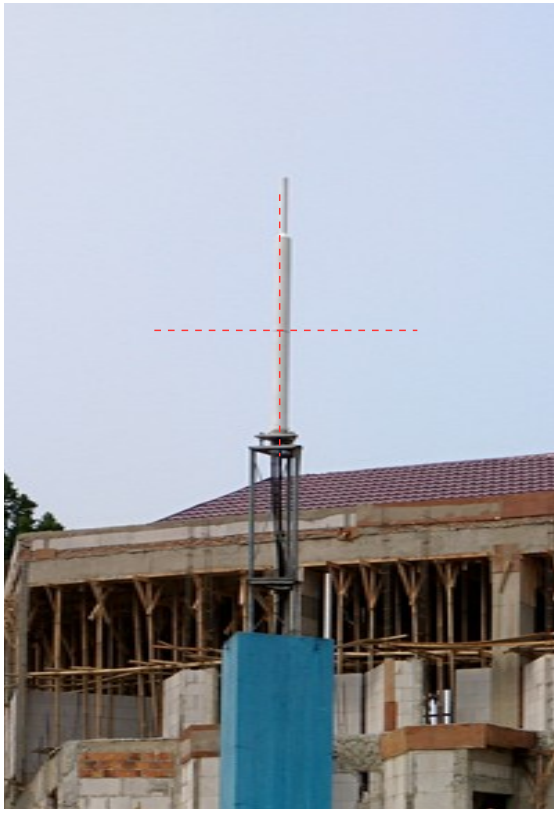
4.2.1. CIBG - GNSS station

The new REGINA GNSS station was installed during the campaign. It is dedicated to the GNSS real time Network for IGS and Navigation (REGINA) project. The antenna is set up on a stainless steel tripod mounted on a bracket fixed to a wall on top of the B building. The reference point is the top and axis of the self centring support coincident with the antenna BPA.

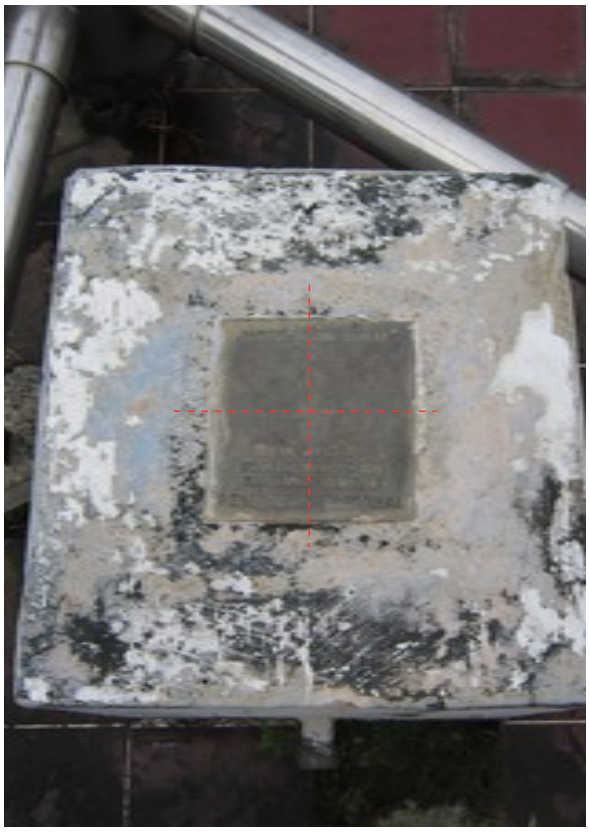
Acronym : **CIBG**	DOMES number : **23101M005**
	
General view	Close-up view (reference point)
Description : REGINA antenna monument & reference point.	

4.2.2. CIDB - DORIS station

The CIDB DORIS (Doppler Orbitography and Radiopositioning Integrated by Satellite) station was set up in January 2009.

Acronym **: CIDB**	DOMES number : **23101S003**
 General view	 Close-up view (reference point)
Description : DORIS antenna monument & reference point	

4.2.3. BAKO - GNSS station

Acronym **: BAKO**	DOMES number : **23101M002**
 General view	 Close-up view (reference point)
Description : BAKO antenna monument. This station is part of the IGS network. The reference point is the marker, 1,648m vertically centered under the antenna reference point.	

5. LOCAL TIE SURVEY DESCRIPTION

5.1. Organization

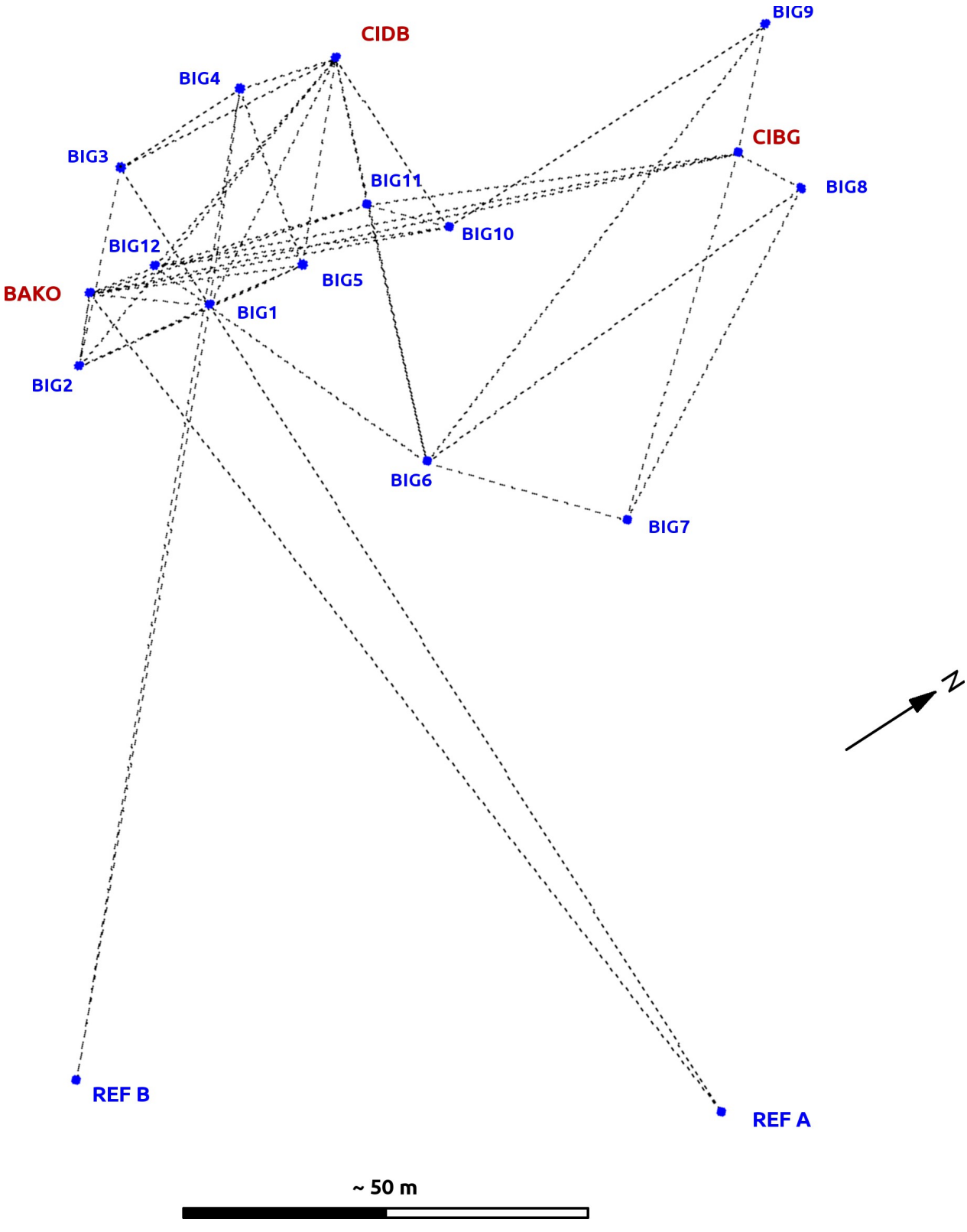
All the topometric survey instruments and equipments are BIG generously lent equipments, except the IGN total station and meteorological station.

5.2. Instruments characteristics

Equipment	Trademark, Serial ref. n°	Specifications, accuracy
Total station	Leica TM 50	EDM st. dev. 0.6mm + 1 pmm Angular st. dev. 0.15 mgon (Manufacturer info.)
4 Prisms	Leica	Dist. Corr. 0 mm
Meteorological station	Kestrel 4500NV serial n°672710	Temp. st. dev. 0.5°C Pressure st. dev. 1 hPa
6 GNSS unit	Leica 1200 bundle	
7 Tripods		Aluminium & wood tripod

5.3. Observations polygon

All the survey was conducted in order to provide the highest accuracy in the determination of the 3D vectors between the observing reference points. Hereafter is the observations polygon.



5.4. Survey method

5.4.1. Survey conditions

The late arrival of equipment on site, the ongoing work on the site and the site configuration (especially vegetation), have led us to do the local tie in a two-step approach.
A first local tie was made between IGS and DORIS with topometric and GNSS measurements.
And a second one, topometric only, was made between IGS, DORIS and REGINA.
The solution proposed here is the combination of the two surveys.

Twelve stations (numbered BIG1 to BIG12) in the immediate vicinity of the GNSS and DORIS reference points were surveyed. All the visible lines of sight were observed with the tacheometer. Horizontal directions and zenith angles were observed in data sets : each set consisting in one reading in both direct and reverse theodolite positions. Distance measurements were observed at least once over each line. Meteorological data (atmospheric pressure and temperature), used to correct the distances, were recorded at the beginning of each station occupation.

5.4.2. GNSS observations (First local tie)

GNSS observations were carried out in order to determine the orientation of the survey network.
Stations A, B, BIG1 to BIG5 were determined by GNSS technique and used to get approximate coordinates. (In final computation, we will finally don't use the B reference)

6. COMPUTATION

6.1. GNSS network

Back at the office, GNSS baselines have been processed with Leica Geo Office v8.3 software using the original set of "absolute" GNSS antenna calibrations (igs08.atx).

The LGO report file is provided in appendix 4.

6.2. Final adjustment

The final computation has been carried out by a 3D least squares adjustment with Microsearch GeoLab 2001 version 2001.9.20.0 software. The input file (see appendix 4) comes from :

- Topometric observations : horizontal and zenithal angles, distances;
- Centering equations: relative positions between points;
- Bearings from the processing of GNSS data

7. RESULTS

7.1. Station name translation table

The following list sums up the most interesting points used in the Microsearch GeoLab input file with the main points in bold (appendix 5).

Point description	Code or DOMES number	Computation name
DORIS station and markers CIDB Antenna Reference Point	23101S003	CIDB
GNSS Stations CIBG (REGINA) – marker BAKO (IGS) – maker BAKO (IGS) – ARP	 23101M005 23101M002	 CIBG BAKO IGS

7.2. Adjusted coordinates and confidence regions

The results of the adjustment are the coordinates of all points as well as their confidence ellipsoids in IGb08 at epoch 2015-285.

The table below provides the 3D coordinates and confidence region at 95% of the points of interest.

```
================================================================================
          CIBG (INDONESIE) REGINA - DORIS - IGS - OCTOBER 2015 SURVEY
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 BAKO         S  6 29  27.79863 E106 50  56.08642     158.1262 m       0
                                  0.0011             0.0011       0.0011
 PLH  000 BIG1         S  6 29  27.42072 E106 50  56.38789     159.1940 m       0
                                  0.0024             0.0025       0.0011
 PLH  000 BIG10        S  6 29  26.44872 E106 50  56.64857     159.0221 m       0
                                  0.0028             0.0029       0.0012
 PLH  000 BIG11        S  6 29  26.67403 E106 50  56.39328     159.4277 m       0
                                  0.0027             0.0028       0.0012
 PLH  000 BIG12        S  6 29  27.51976 E106 50  56.13630     159.1882 m       0
                                  0.0028             0.0025       0.0013
 PLH  000 BIG2         S  6 29  27.99189 E106 50  56.30974     159.3016 m       0
                                  0.0024             0.0025       0.0011
 PLH  000 BIG3         S  6 29  27.42002 E106 50  55.73194     159.0935 m       0
                                  0.0027             0.0025       0.0012
 PLH  000 BIG4         S  6 29  26.84980 E106 50  55.72609     159.1268 m       0
                                  0.0027             0.0026       0.0012
 PLH  000 BIG5         S  6 29  27.02241 E106 50  56.45826     158.9620 m       0
                                  0.0024             0.0026       0.0012
 PLH  000 BIG6         S  6 29  27.03035 E106 50  57.39370     169.2691 m       0
                                  0.0030             0.0027       0.0013
 PLH  000 BIG7         S  6 29  26.48638 E106 50  58.02770     169.3145 m       0
                                  0.0034             0.0029       0.0013
 PLH  000 BIG8         S  6 29  25.18184 E106 50  57.28850     168.5582 m       0
                                  0.0030             0.0040       0.0013
 PLH  000 BIG9         S  6 29  24.94552 E106 50  56.65658     168.5959 m       0
                                  0.0028             0.0042       0.0013
 PLH  000 CIBG         S  6 29  25.31576 E106 50  57.02944     169.1039 m       0
                                  0.0031             0.0040       0.0020
 PLH  000 CIDB         S  6 29  26.46018 E106 50  55.82928     161.5712 m       0
                                  0.0027             0.0027       0.0012
 PLH  000 IGS          S  6 29  27.79863 E106 50  56.08642     159.7428 m       0
                                  0.0025             0.0025       0.0012
 PLH  000 REFERENCE_A  S  6 29  27.45556 E106 51   0.23397     159.0282 m       0
                                  0.0016             0.0016       0.0177
 PLH  000 REGINA       S  6 29  25.31576 E106 50  57.02944     169.3449 m       0
                                  0.0029             0.0038       0.0013
 PLH  000 REGINA_B     S  6 29  25.31577 E106 50  57.02945     168.9876 m       0
                                  0.0029             0.0038       0.0013
```

```
================================================================================
          CIBG (INDONESIE) REGINA - DORIS - IGS - OCTOBER 2015 SURVEY
Microsearch GeoLab, V2001.9.20.0            WGS 84      UNITS: m,GRAD Page 0004
================================================================================
Adjusted XYZ Coordinates:
                           X-COORDINATE       Y-COORDINATE       Z-COORDINATE
 CODE FFF STATION               STD DEV            STD DEV            STD DEV
 ---- --- ------------ ------------------ ------------------ ------------------
 XYZ      BAKO             -1836969.3719       6065616.9871       -716257.8889 m       0
                                  0.0011             0.0011             0.0011
 XYZ      BIG1             -1836978.9249       6065616.5737       -716246.4748 m       0
                                  0.0025             0.0013             0.0024
 XYZ      BIG10            -1836987.5195       6065617.3192       -716216.7872 m       0
                                  0.0028             0.0015             0.0028
 XYZ      BIG11            -1836979.9024       6065619.2296       -716223.7101 m       0
                                  0.0027             0.0014             0.0027
 XYZ      BIG12            -1836971.4252       6065618.4796       -716249.4970 m       0
                                  0.0024             0.0014             0.0028
 XYZ      BIG2             -1836976.0830       6065615.4736       -716263.9207 m       0
                                  0.0024             0.0013             0.0024
 XYZ      BIG3             -1836959.6074       6065622.3222       -716246.4421 m       0
                                  0.0025             0.0013             0.0027
 XYZ      BIG4             -1836960.0187       6065624.3012       -716229.0412 m       0
                                  0.0026             0.0013             0.0027
 XYZ      BIG5             -1836981.3284       6065617.0503       -716234.2908 m       0
                                  0.0025             0.0013             0.0024
 XYZ      BIG6             -1837011.7972       6065618.4942       -716235.6985 m       0
                                  0.0026             0.0015             0.0030
 XYZ      BIG7             -1837031.0019       6065614.6989       -716219.1000 m       0
                                  0.0028             0.0016             0.0034
 XYZ      BIG8             -1837010.3596       6065624.8986       -716179.1961 m       0
                                  0.0038             0.0018             0.0029
 XYZ      BIG9             -1836992.0255       6065631.3477       -716171.9873 m       0
                                  0.0040             0.0018             0.0028
 XYZ      CIBG             -1837002.7637       6065627.2797       -716183.3456 m       0
                                  0.0038             0.0023             0.0031
 XYZ      CIDB             -1836964.1494       6065627.0016       -716217.4251 m       0
                                  0.0027             0.0014             0.0027
 XYZ      IGS              -1836969.8375       6065618.5244       -716258.0717 m       0
                                  0.0024             0.0013             0.0025
 XYZ      REFERENCE_A      -1837091.9434       6065582.0463       -716247.5193 m       0
                                  0.0053             0.0169             0.0025
 XYZ      REGINA           -1837002.8331       6065627.5088       -716183.3728 m       0
                                  0.0036             0.0017             0.0028
 XYZ      REGINA_B         -1837002.7305       6065627.1690       -716183.3328 m       0
                                  0.0036             0.0017             0.0028
```

```
================================================================================
          CIBG (INDONESIE) REGINA - DORIS - IGS - OCTOBER 2015 SURVEY
Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0018
================================================================================
2-D and 1-D Station Confidence Regions (95.000 and 95.000 percent):
STATION            MAJOR SEMI-AXIS  AZ     MINOR SEMI-AXIS             VERTICAL
------------ --------------------- --- ------------------ --------------------
BAKO              0.0031 (104, 90)      0.0031 (298,  0)      0.0031 (208,  0)
BIG1              0.0072 ( 66,  0)      0.0065 (156,  0)      0.0032 (314, 90)
BIG10             0.0082 ( 88,  0)      0.0077 (178,  0)      0.0034 (296, 90)
BIG11             0.0079 ( 62,  0)      0.0074 (152,  0)      0.0034 (290, 90)
BIG12             0.0079 ( 15,  0)      0.0070 (105,  0)      0.0035 (281, 90)
BIG2              0.0071 (291,  0)      0.0067 (201,  0)      0.0032 ( 38, 90)
BIG3              0.0077 ( 25,  0)      0.0070 (115,  0)      0.0032 (232, 90)
BIG4              0.0082 ( 40,  0)      0.0067 (130,  0)      0.0033 (262, 90)
BIG5              0.0075 ( 62,  0)      0.0064 (152,  0)      0.0032 (306, 90)
BIG6              0.0084 (166,  0)      0.0074 ( 76,  0)      0.0036 (324, 90)
BIG7              0.0100 (152,  0)      0.0076 ( 62,  0)      0.0037 (320, 90)
BIG8              0.0114 (110,  0)      0.0078 (200,  0)      0.0036 (302, 90)
BIG9              0.0116 ( 94,  0)      0.0077 (184,  0)      0.0036 (292, 90)
CIBG              0.0112 (105,  0)      0.0084 (195,  0)      0.0057 (299, 90)
CIDB              0.0085 ( 45,  0)      0.0067 (135,  0)      0.0033 (276, 90)
IGS               0.0070 (104,  0)      0.0070 (194,  0)      0.0032 (296, 90)
REFERENCE_A       0.0496 (265, 90)      0.0044 ( 88,  0)      0.0044 (358,  0)
REGINA            0.0108 (105,  0)      0.0078 (195,  0)      0.0036 (298, 90)
REGINA_B          0.0108 (105,  0)      0.0078 (195,  0)      0.0036 (298, 90)
```

7.3. Vector Coordinates

Differential components between points of interest in IGb08:

Vector	DX (m)	DY (m)	DZ (m)
CIBG – CIDB	38.6143	-0.2781	-34.0795
CIBG – BAKO	33.3918	-10.2926	-74.5433

8. APPENDICES

Appendix 1 : "CIDB" DORIS station site log (extract)

Note : only the most relevant information to this survey is retained in the following extract.

The complete version of this site log is available at : http://ids-doris.org/network/sitelogs.html

```
2. DORIS antenna and reference point information

2.1
    Four character ID        : CIBB
    Antenna model            : Starec 52290 type
    Antenna serial number    :
    IERS DOMES number        : 23101S001
    CNES/IGN number          : 231011
    DORIS SSALTO number      : 1045
    Date installed (dd/mm/yy): 07/09/1992
    Date removed (dd/mm/yy)  : 11/12/2000
    Antenna support type     : Guyed 3 metre tower
    Installed on             : Pyramidal reinforced concrete block (2.5 m deep,
                               base: 1.6 x 1.6m)
    Height above ground mark : 3.420 m
    Ground mark type         : Brass mark 20 mm diameter
    Ground mark DOMES number : 23101M001
2.2
    Four character ID        : CICB
    Antenna model            : Starec 52291 type
    Antenna serial number    : 76
    IERS DOMES number        : 23101S002
    CNES/IGN number          : 231012
    DORIS SSALTO number      : 98
    Date installed (dd/mm/yy): 12/12/2000
    Date removed (dd/mm/yy)  : 07/01/2009
    Antenna support type     : Concrete pillar 0,35m sided, 3 meters high.
    Installed on             : Pillar supported by pyramidal basement 2,5 m deep
                               (1,6 x 1,6 m pyramid base dimension)
    Height above ground mark : 0.642 m
    Ground mark type         : Domed brass mark 12 mm diameter on top of
                               concrete pillar
    Ground mark DOMES number : 23101M003
2.3
    Four character ID        : CIDB
    Antenna model            : Starec 52291 type
    Antenna serial number    : 119
    IERS DOMES number        : 23101S003
    CNES/IGN number          : 231013
    DORIS SSALTO number      : 286
    Date installed (dd/mm/yy): 07/01/2009
    Date removed (dd/mm/yy)  :
    Antenna support type     : Concrete pillar 0.35 m sided, 3 meters high
    Installed on             : Pillar supported by pyramidal basement 2.5 m deep
                               (1.6 x1.6 m pyramid base dimension)
    Height above ground mark : 1.139 m
    Ground mark type         : Domed brass mark 12 mm diameter on top of
                               concrete pillar
    Ground mark DOMES number : 23101M003
```

```
3. DORIS beacons information

3.11
    Beacon serial number        : 2819025
    Beacon model                : 3.0
    USO serial number           : 3.340
    4 Char. ID of the REF point : CIDB
    Date installed (dd/mm/yy)   : 30/11/2010
    Date removed (dd/mm/yy)     :

4. ITRF coordinates and velocities of the current DORIS ref. point (CIDB)
    Solution         : ITRF2008 (tie to CICB)
    Epoch            : 2005.0

    X = -1836963.906 m    Y = 6065627.114 m    Z = -716217.349 m
    Sig X = 0.002 m    Sig Y = 0.002 m    Sig Z = 0.002 m

    VX = -0.0232 m/y    VY = -0.0111 m/y    VZ = -0.0062 m/y
    Sig VX = 0.0005 m/y    Sig VY = 0.0004 m/y    Sig VZ = 0.0003 m/y

7. Local site ties
7.1
    Point description      : Brass mark on top of a 3 m concrete pillar
    DOMES number           : 23101M003
    Differential components from the current DORIS ref. point (CIDB)
    to the above point (in the ITRS) :
    dX (m)                 : 0.328
    dY (m)                 : -1.083
    dZ (m)                 : 0.129
    Accuracy (m)           : 0.001
    Date measured          : 06/01/2009
    Additional information : Survey by IGN-F 1998, 2000 & 2009
7.2
    Point description      : DORIS Starec antenna reference point (CIBB)
    DOMES number           : 23101S001
    Differential components from the current DORIS ref. point (CIDB)
    to the above point (in the ITRS) :
    dX (m)                 : 0.136
    dY (m)                 : -0.517
    dZ (m)                 : 0.051
    Accuracy (m)           : 0.002
    Date measured          : 06/01/2009
    Additional information : Survey by IGN-F 1998, 2000 & 2009
7.3
    Point description      : DORIS Starec antenna reference point (CICB)
    DOMES number           : 23101S002
    Differential components from the current DORIS ref. point (CIDB)
    to the above point (in the ITRS) :
    dX (m)                 : 0.137
    dY (m)                 : -0.475
    dZ (m)                 : 0.052
    Accuracy (m)           : 0.001
    Date measured          : 06/01/2009
    Additional information : Survey by IGN-F 1998, 2000 & 2009
7.4
    Point description      : IGS mark BAKO
    DOMES number           : 23101M002
    Differential components from the current DORIS ref. point (CIDB)
    to the above point (in the ITRS) :
    dX (m)                 : -5.522
    dY (m)                 : -10.010
    dZ (m)                 : -40.465
    Accuracy (m)           : 0.002
    Date measured          : 06/01/2009
    Additional information : Survey by IGN-F 1998, 2000 & 2009
```

Appendix 2 : "CIBG" GNSS station site log (extract)

Note : only the most relevant information to this survey is retained in the following extract.

```
     CIBG Site Information Form (site log)
     International GNSS Service
     See Instructions at:
       ftp://igscb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0.   Form

     Prepared by (full name)  : Kevin EYERMANN & Thierry LAWRENCE
     Date Prepared            : 2016-07-28
     Report Type              : UPDATE
     If Update:
      Previous Site Log       : cibg_20151207.log
      Modified/Added Sections : 5.1, 5.2, 7.1

1.   Site Identification of the GNSS Monument

     Site Name                : Cibinong
     Four Character ID        : CIBG
     Monument Inscription     : None
     IERS DOMES Number        : 23101M005
     CDP Number               :
     Monument Description     : STEEL ANTENNA MOUNT ON A BRACKET
       Height of the Monument : 0.43 m
       Monument Foundation    : WALL ON THE ROOF
       Foundation Depth       :
     Marker Description       :
     Date Installed           : 2015-10-10T12:00Z
     Geologic Characteristic  : Alluvial
       Bedrock Type           : SEDIMENTARY
       Bedrock Condition      :
       Fracture Spacing       :
       Fault zones nearby     : NO
         Distance/activity    :
     Additional Information   : installed on the terrasse roof

2.   Site Location Information

     City or Town             : Cibinong
     State or Province        : West Java
     Country                  : Indonesia
     Tectonic Plate           : EURASIAN
     Approximate Position (ITRF)
       X coordinate (m)       : -1837002.6304
       Y coordinate (m)       : 6065627.3598
       Z coordinate (m)       : -716183.2715
       Latitude (N is +)      : -062925.31323
       Longitude (E is +)     : +1065057.02453
       Elevation (m,ellips.)  : 169.1334
     Additional Information   : coordinates ITRF2008 epoch 2012.0

3.   GNSS Receiver Information

3.1  Receiver Type            : LEICA GR10
     Satellite System         : GPS+GLO+GAL+BDS+QZSS+SBAS
     Serial Number            : 1700870
     Firmware Version         : 3.22
     Elevation Cutoff Setting : 0 deg
     Date Installed           : 2015-10-10T12:00Z
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Temperature Stabiliz.    : 25.0 +/- 3.0
```

```
     Additional Information   :

4.   GNSS Antenna Information

4.1  Antenna Type             : LEIAR25.R4      NONE
     Serial Number            : 725039
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  : 0.0000
     Marker->ARP North Ecc(m) : 0.0000
     Marker->ARP East Ecc(m)  : 0.0000
     Alignment from True N    : 0 deg
     Antenna Radome Type      : NONE
     Radome Serial Number     :
     Antenna Cable Type       : RF GEV 134
     Antenna Cable Length     : 60 m
     Date Installed           : 2015-10-10T12:00Z
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Additional Information   : Cable RF GEV 134 50 m + surge protection
                              : + cable RF 10m

5.   Surveyed Local Ties

5.1  Tied Marker Name         : DORIS antenna ref. pt. (CIDB)
     Tied Marker Usage        : DORIS
     Tied Marker CDP Number   :
     Tied Marker DOMES Number : 22006S002
     Differential Components from GNSS Marker to the tied monument (ITRS)
       dx (m)                 : 38.6137
       dy (m)                 : -0.2783
       dz (m)                 : -34.0801
     Accuracy (mm)            :
     Survey method            : TRIANGULATION
     Date Measured            : 2015-10-12T00:00Z
     Additional Information   : high geodetic surveying

5.2  Tied Marker Name         : BAKO
     Tied Marker Usage        :
     Tied Marker CDP Number   :
     Tied Marker DOMES Number : 22006M005
     Differential Components from GNSS Marker to the tied monument (ITRS)
       dx (m)                 : 33.3949
       dy (m)                 : -10.2918
       dz (m)                 : -74.5415
     Accuracy (mm)            :
     Survey method            : TRIANGULATION
     Date Measured            : 2015-10-12T00:00Z
     Additional Information   : high geodetic surveying

6.   Frequency Standard

6.1  Standard Type            : INTERNAL
       Input Frequency        :
       Effective Dates        : 2015-10-10/CCYY-MM-DD
       Notes                  :

7.   Collocation Information

7.1  Instrumentation Type     : DORIS
       Status                 : PERMANENT
       Effective Dates        : 2009-01-07/CCYY-MM-DD
       Notes                  : CIDB

7.2  Instrumentation Type     : GPS
       Status                 : PERMANENT
       Effective Dates        : 1989-09-10/CCYY-MM-DD
       Notes                  : BAKO
```

11. On-Site, Point of Contact Agency Information

Agency	: BIG
Preferred Abbreviation	: Badan Informasi Geospasial
Mailing Address	: Jl. Raya Jakarta-Bogor Km.46
	: Cibinong 16911
	: Jawa Barat - Indonesia
Primary Contact	
Contact Name	: Joni Efendi
Telephone (primary)	: 62 21 875 7329
Telephone (secondary)	: 62 21 875 2062 ext. 3102
Fax	: 62 21 875 7329; 875 4592
E-mail	: joni.efendi@big.go.id
Additional Information	:

12. Responsible Agency (if different from 11.)

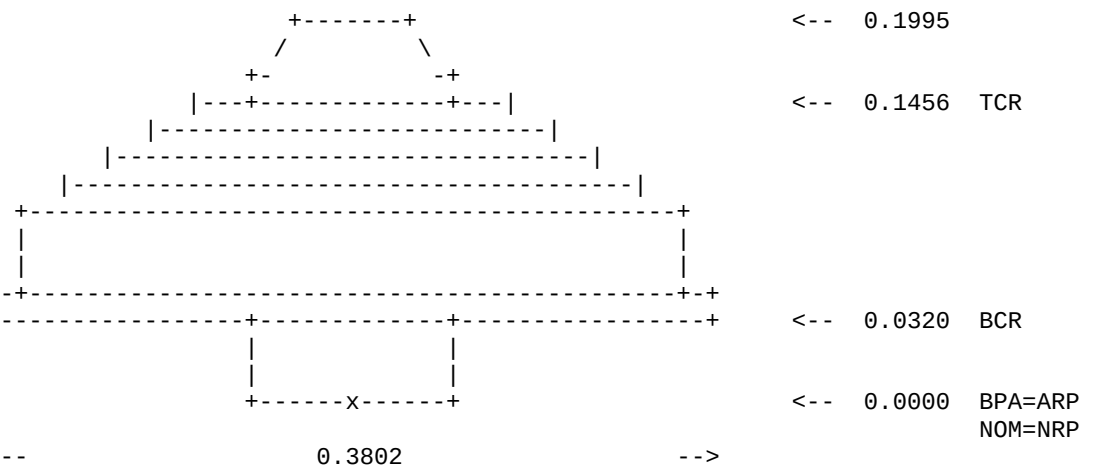
Agency	: Centre National d'Etudes Spatiales
Preferred Abbreviation	: CNES
Mailing Address	: CNES DCT/ME/NC 18, avenue Edouard Belin
	: 31401 Toulouse cedex 09 - France
Primary Contact	
Contact Name	: Jean-Paul Cardaliaguet
Telephone (primary)	: (33) 5.61.27.31.98
Telephone (secondary)	: (33) 5.61.28.35.22
Fax	:
E-mail	: jean-paul.cardaliaguet@cnes.fr
Secondary Contact	
Contact Name	: Regina generic email
Telephone (primary)	:
Telephone (secondary)	:
Fax	:
E-mail	: regina.operation@cnes.fr
Additional Information	:

13. More Information

Primary Data Center	: IGN
Secondary Data Center	: CDDIS

Antenna Graphics with Dimensions

LEIAR25



Appendix 3: "BAKO" IGS station site log (extract)

Note : only the most relevant information to this survey is retained in the following extract.

```
   BAKO Site Information Form (site log)
     International GNSS Service
     See Instructions at:
       ftp://igscb.jpl.nasa.gov/pub/station/general/sitelog_instr.txt

0.   Form
     Prepared by (full name)  : David Maggert
     Date Prepared            : 2011-11-29
     Report Type              : UPDATE
     If Update:
      Previous Site Log       : bako_20110501.log
      Modified/Added Sections : 4.26

1.   Site Identification of the GNSS Monument

     Site Name                : BAKOSURTANAL
     Four Character ID        : BAKO
     Monument Inscription     :
     IERS DOMES Number        : 23101M002
     CDP Number               : (A4)
     Monument Description     : Pillar
       Height of the Monument : 0.50
       Monument Foundation    : CONCRETE BLOCK
       Foundation Depth       : 1.50
     Marker Description       : BRASS Tablet
     Date Installed           : 1981-06-12T00:00Z
     Geologic Characteristic  : Alluvial
       Bedrock Type           : SEDIMENTARY
       Bedrock Condition      : (FRESH/JOINTED/WEATHERED)
       Fracture Spacing       : (1-10 cm/10-50 cm/50-200 cm/over 200 cm)
       Fault zones nearby     : NO
         Distance/activity    : (multiple lines)
     Additional Information   : Permanent tripod (stainless-steel) above the
                              : pillar.
                              : Concrete Pillar, 50 cm above ground surface.

2.   Site Location Information
     City or Town             : Cibinong
     State or Province        : West Java
     Country                  : Indonesia
     Tectonic Plate           : EURASIAN
     Approximate Position (ITRF)
       X coordinate (m)       : -1836969.054
       Y coordinate (m)       : 6065617.126
       Z coordinate (m)       : -716257.839
       Latitude (N is +)      : -062924.00
       Longitude (E is +)     : +1065100.00
       Elevation (m,ellips.)  : 158.18
     Additional Information   : +138.4550 m (above mean sea level).
                              : Block of Eurasian Plate.
                              : Reference frame used is (ITRF2000).
                              : Coordinate system used is (WGS84)
                              : IPGSN (Indonesian Permanent GNSS Station
                              : Network).

3.   GNSS Receiver Information
...
3.15 Receiver Type            : LEICA GRX1200GGPRO
     Satellite System         : GPS+GLO
     Serial Number            : 351658
     Firmware Version         : 8.10 / 3.019
```

```
     Elevation Cutoff Setting : 0
     Date Installed           : 2011-05-01T00:00Z
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Temperature Stabiliz.    : (none or tolerance in degrees C)
     Additional Information   :

4.   GNSS Antenna Information
...
4.28 Antenna Type             : LEIAT504GG      LEIS
     Serial Number            : 200046
     Antenna Reference Point  : BPA
     Marker->ARP Up Ecc. (m)  : 1.648
     Marker->ARP North Ecc(m) : (F8.4)
     Marker->ARP East Ecc(m)  : (F8.4)
     Alignment from True N    : 0 degrees
     Antenna Radome Type      : LEIS
     Radome Serial Number     :
     Antenna Cable Type       : (vendor & type number)
     Antenna Cable Length     : 60
     Date Installed           : 2010-11-24T00:00Z
     Date Removed             : (CCYY-MM-DDThh:mmZ)
     Additional Information   : Antenna height refers to bottom of ground
                              : plane measured from station mark.

7.   Collocation Information
7.1  Instrumentation Type     : DORIS
       Status                 : PERMANENT
       Effective Dates        : CCYY-MM-DD/CCYY-MM-DD
       Notes                  : Measurement tie by using GPS geodetic
                              : receiver Trimble 4000SSi observation start
                              : 00h:00m finished 23h:59m UT.
                              : (more information contact IGN, Z. Altamimi)

11.  On-Site, Point of Contact Agency Information

     Agency                   : National Coordination Agency for Surveys and
                              : Mapping
     Preferred Abbreviation   : BAKOSURTANAL
     Mailing Address          : Jl. Raya Jakarta-Bogor Km.46
                              : Cibinong 16911
                              : Jawa Barat - Indonesia
     Primary Contact
       Contact Name           : Joni Efendi
       Telephone (primary)    : 62 21 875 7329
       Telephone (secondary)  : 62 21 875 2062 ext. 3102
       Fax                    : 62 21 875 7329; 875 4592
       E-mail                 : joni-efendi@bakosurtanal.go.id
     Secondary Contact
       Contact Name           : Elisa Harlia Sandi
       Telephone (primary)    : 62 21 875 7329
       Telephone (secondary)  : 62 21 875 2062 ext. 3112
       Fax                    : 62 21 875 7329
       E-mail                 : bu_imam@yahoo.com
     Additional Information   : (Primary) Alternate email for joni efendi is
                              : joniefendi@yahoo.com

13.  More Information

     Primary Data Center      : Scripps Orbit and Permanent Array Center
     Secondary Data Center    : Crustal Dynamics Data Information System
```

Appendix 4 : LEICA Geo Office report file

- when it has to be right

Leica Geosystems

Récapitulatif du Traitement
BAKO-A-1-6

Informations sur le Projet

Nom du Projet:	BAKO-A-1-6
Date de création:	06/30/2016 13:25:04
Fuseau Horaire:	1h 00'
Nom Syst. Coordonnées:	WGS 1984
Logiciel d'application:	LEICA Geo Office 8.3
Date et heure de début:	10/08/2015 03:33:13
Date et heure de fin:	10/08/2015 11:39:13
Points occupés manuellement:	14
Noyau de Post-Traitement:	PSI-Pro 3.0
Traité:	06/30/2016 14:21:28

Paramètres de Traitement

Paramètres	**Sélectionnés**
Angle de Coupure:	10°
Type d'Ephémérides:	Précises
Type de solution:	Automatique
Type GNSS:	Automatique
Fréquence:	Automatique
Fixer les ambiguïtés jusqu'à:	80 km
Durée mini pour solution flottante (statique):	5' 00"
Taux d'échantillonnage:	Tout Utiliser
Modèle Troposphérique:	Hopfield
Modèle Ionosphérique:	Automatique
Utiliser modélisation statistique:	Oui
Distance mini.:	8 km
Activité ionosphérique:	Automatique

Ligne de Base - Aperçu

BAKO - BIG1	**Référence: BAKO**	**Mobile: BIG1**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 27.42087" S
Longitude:	106° 50' 56.08669" E	106° 50' 56.38823" E
Hteur Ellip.:	158.1139 m	159.1663 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	

BIGA - BIG1	**Référence: BIGA**	**Mobile: BIG1**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 27.42085" S
Longitude:	106° 51' 00.23424" E	106° 50' 56.38819" E
Hteur Ellip.:	159.0158 m	159.1703 m

Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG2	**Référence: BAKO**	**Mobile: BIG2**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 27.99116" S
Longitude:	106° 50' 56.08669" E	106° 50' 56.31552" E
Hteur Ellip.:	158.1139 m	159.3326 m
Type de solution:	Flottante	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Non	
BIGA - BIG2	**Référence: BIGA**	**Mobile: BIG2**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 27.99210" S
Longitude:	106° 51' 00.23424" E	106° 50' 56.30980" E
Hteur Ellip.:	159.0158 m	159.2559 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG3	**Référence: BAKO**	**Mobile: BIG3**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 27.42036" S
Longitude:	106° 50' 56.08669" E	106° 50' 55.73247" E
Hteur Ellip.:	158.1139 m	159.0683 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BIGA - BIG3	**Référence: BIGA**	**Mobile: BIG3**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 27.42044" S
Longitude:	106° 51' 00.23424" E	106° 50' 55.73246" E
Hteur Ellip.:	159.0158 m	159.0652 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG3	**Référence: BAKO**	**Mobile: BIG3**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 27.42030" S
Longitude:	106° 50' 56.08669" E	106° 50' 55.73240" E
Hteur Ellip.:	158.1139 m	159.0617 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	

Ambiguïté:	Oui	
BIGA - BIG3	**Référence: BIGA**	**Mobile: BIG3**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 27.42022" S
Longitude:	106° 51' 00.23424" E	106° 50' 55.73243" E
Hteur Ellip.:	159.0158 m	159.0578 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG4	**Référence: BAKO**	**Mobile: BIG4**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 26.84991" S
Longitude:	106° 50' 56.08669" E	106° 50' 55.72643" E
Hteur Ellip.:	158.1139 m	159.0925 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BIGA - BIG4	**Référence: BIGA**	**Mobile: BIG4**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 26.85040" S
Longitude:	106° 51' 00.23424" E	106° 50' 55.72649" E
Hteur Ellip.:	159.0158 m	159.0647 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG4	**Référence: BAKO**	**Mobile: BIG4**
Coordonnées:		
Latitude:	6° 29' 27.79874" S	6° 29' 26.84989" S
Longitude:	106° 50' 56.08669" E	106° 50' 55.72650" E
Hteur Ellip.:	158.1139 m	159.0897 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BIGA - BIG4	**Référence: BIGA**	**Mobile: BIG4**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 26.84997" S
Longitude:	106° 51' 00.23424" E	106° 50' 55.72644" E
Hteur Ellip.:	159.0158 m	159.0860 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BAKO - BIG5	**Référence: BAKO**	**Mobile: BIG5**
Coordonnées:		

Latitude:	6° 29' 27.79874" S	6° 29' 27.02246" S
Longitude:	106° 50' 56.08669" E	106° 50' 56.45857" E
Hteur Ellip.:	158.1139 m	158.9221 m
Type de solution:	Phase: toutes fixes	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Oui	
BIGA - BIG5	**Référence: BIGA**	**Mobile: BIG5**
Coordonnées:		
Latitude:	6° 29' 27.45566" S	6° 29' 27.01928" S
Longitude:	106° 51' 00.23424" E	106° 50' 56.45050" E
Hteur Ellip.:	159.0158 m	158.5207 m
Type de solution:	Flottante	
Type GNSS:	GPS	
Fréquence:	L1/E1 et L2	
Ambiguïté:	Non	

Appendix 5 : Local survey adjustment input file

```
 TITL  CIBG (INDONESIE) REGINA - CIDB  - IGS - OCTOBER 2015 SURVEY
 COMP ADJ
 ELIP WGS 84             6378137.000  6356752.3142   0.0000   0.0000   0.0000 m
 MAXI         15
 CONF YES YES YES YES CON
 PSOL NO  YES
 PMIS NO  NO
 PRES YES NO
 PADJ NO  NO  YES NO  YES NO
 VARF YES YES NO
 RTST TAU MAX
 LUNT m    1.000000000000
 CONV    0.00010
 CLEV     95.000
 ANGT GRD
 LDEC 4

 SIGM AH          8.0
 SIGM AH2        12.0
 SIGM ZA         14.0
 SIGM ZA2        16.0
 SIGM DP       0.0010

 HIST NEW

*********************************************************************************************

 XYZ  000 BAKO              -1836969.3719       6065616.9871       -716257.8889 m
 XYZ  000 CIDB              -1836964.1530       6065627.0004       -716217.4275 m
 XYZ  000 IGS               -1836969.8419       6065618.5234       -716258.0739 m

 XYZ  000 BIG1              -1836978.9269       6065616.5438       -716246.4762 m
 XYZ  000 BIG2              -1836976.0712       6065615.4290       -716263.9221 m
 XYZ  000 BIG3              -1836959.6152       6065622.2924       -716246.4497 m
 XYZ  000 BIG4              -1836960.0187       6065624.2653       -716229.0404 m
 XYZ  000 BIG5              -1836981.3261       6065617.0093       -716234.2880 m
 XYZ  000 REFERENCE_A       -1837091.9475       6065582.0318       -716247.5212 m

 PLH  000 BIG10         s  6 29 26.175850 e106 50 56.402272     159.0000 m  0
 PLH  000 BIG11         s  6 29 26.487933 e106 50 56.178710     159.0000 m  0
 PLH  000 BIG12         s  6 29 27.294020 e106 50 56.107333     159.0000 m  0
 PLH  000 BIG6          s  6 29 26.591360 e106 50 57.228895     169.0000 m  0
 PLH  000 BIG7          s  6 29 25.908892 e106 50 57.751254     169.0000 m  0
 PLH  000 BIG8          s  6 29 24.767358 e106 50 56.772747     169.0000 m  0
 PLH  000 BIG9          s  6 29 24.611683 e106 50 56.060755     169.0000 m  0

 PLH  000 CIBG          s  6 29 25.314380 e106 50 57.027740     169.2410 m
 PLH  000 REGINA        s  6 29 25.314380 e106 50 57.027740     169.0000 m
 PLH  000 REGINA_B      s  6 29 25.314380 e106 50 57.027740     168.8816 m

*********************************************************************************************

 3DC
 XYZ  000 BAKO              -1836969.3719       6065616.9871       -716257.8889 m
 COV  CT DIAG
 ELEM                0.000001               0.000001               0.000001

 2DD
 PL   00  IGS           s  6 29 27.798630 e106 50 56.086420
 PL   00  BAKO          s  6 29 27.798630 e106 50 56.086420
 COV  LG DIAG
 ELEM                0.000004               0.000004

 3DD
 PLH  000 REGINA        s  6 29 25.314380 e106 50 57.027740     169.2410
 PLH  000 CIBG          s  6 29 25.314380 e106 50 57.027740     169.0000
 PLH  000 REGINA_B      s  6 29 25.314380 e106 50 57.027740     168.8816
 COV  LG DIAG
 ELEM                0.000001               0.000001               0.000002
 ELEM                0.000001               0.000001               0.000002

*********************************************************************************************
```

```
 3DD
 DXYZ     BAKO          REFERENCE_A      -122.5715      -34.9408       10.3696 m
 COV  LG DIAG
 ELEM               0.000001                0.000001                0.00025

*********************************************************************************************

 DSET AH
 DIR      BIG1          REFERENCE_A                0  0     0.0
*DIR      BIG1          REFERENCE_B               46 63    38.4
 DIR      BIG1          BIG2                     108  8    20.4
 DIR      BIG1          IGS                      142 29    67.4
*DIR      BIG1          BAKO                     142 29    28.4
 DIR      BIG1          BIG3                     199 49     9.7
 DIR      BIG1          BIG4                     244 73    22.3
 DIR      BIG1          CIDB                     265 88    11.8         16
 DIR      BIG1          BIG5                     310 55    76.8
 DSET AH
 DIR      BIG2          BIG3                       0  0     0.0
 DIR      BIG2          CIDB                      30 98     5.6
 DIR      BIG2          BIG1                      58 99    22.7
 DIR      BIG2          IGS                      395 74    29.9
*DIR      BIG2          BAKO                     395 75    47.4
 DIR      BIG2          BIG5                      60  1    34.8
 DSET AH
*DIR      BIG3          REFERENCE_A                0  0     0.0
 DIR      BIG3          BIG2                      49 37    94.1
 DIR      BIG3          BIG4                     299  5    75.9         16
 DIR      BIG3          CIDB                     306 15    46.0         24
 DIR      BIG3          BIG1                     399 78    31.5
 DSET AH
*DIR      BIG4          REFERENCE_B                0  0     0.0
 DIR      BIG4          BIG5                     367 93    87.6
 DIR      BIG4          BIG1                     398 51    14.3
 DIR      BIG4          BIG3                      52 55     1.8         16
 DIR      BIG4          CIDB                     269 68    87.9
 DSET AH
 DIR      BIG5          BIG2                       0  0     0.0
 DIR      BIG5          BIG1                       1 45    63.7
 DIR      BIG5          BIG4                     105  5    74.9
 DIR      BIG5          CIDB                     136 75    17.6
 DIR      BIG5          IGS                       18 76    56.9

*********************************************************************************************

 DSET AH2
*DIR      BIG6          REF_NORTH                  0  0     0.0
 DIR      BIG6          BIG7                      59  2    50.0
 DIR      BIG6          BIG12                    280 53    72.2
 DIR      BIG6          BIG11                    325 94    11.3
 DIR      BIG6          BIG9                     382 52    39.5
 DIR      BIG6          CIDB                     326 40    91.0
 DSET AH2
*DIR      BIG7          REF_EAST                   0  0     0.0
 DIR      BIG7          BIG8                     256 30    95.5
 DIR      BIG7          REGINA_B                 244 17    74.9
 DIR      BIG7          REGINA                   244 17    74.0
 DIR      BIG7          BIG6                     143 99    66.3
 DSET AH2
 DIR      BIG8          BIG7                       0  0     0.0
 DIR      BIG8          BIG6                      29 20    75.8
 DIR      BIG8          REGINA                   102 45    67.5
 DIR      BIG8          REGINA_B                 102 45    35.2
 DSET AH2
*DIR      BIG9          REF_WEST                   0  0     0.0
 DIR      BIG9          REGINA                   299 34    10.0
 DIR      BIG9          REGINA_B                 299 34    16.4
 DIR      BIG9          BIG6                     327 93    25.5
 DIR      BIG9          BIG10                    349 91     6.1
 DSET AH2
 DIR      BIG10         BIG9                       0  0     0.0
 DIR      BIG10         BIG12                    228  6    49.3
 DIR      BIG10         IGS                      224 78    27.4
 DIR      BIG10         BIG11                    253 63    26.3
*DIR      BIG10         CIDB                     298 73    87.4         20
```

```
 DSET AH2
 DIR      BIG11        REGINA                    0  0     0.0
 DIR      BIG11        REGINA_B                  0  0     4.5
 DIR      BIG11        BIG10                    26  8    14.8
 DIR      BIG11        CIDB                    295 17    71.3
 DIR      BIG11        BIG6                     93 88    71.8
 DIR      BIG11        IGS                     189  7    65.4         20
 DIR      BIG11        BIG12                   190 89     6.6
 DSET AH2
 DIR      BIG12        REGINA                    0  0     0.0
 DIR      BIG12        REGINA_B                399 99    98.1
 DIR      BIG12        BIG10                     3 88    97.8
 DIR      BIG12        BIG11                   394 27     9.0
 DIR      BIG12        IGS                     186 75    43.0
 DIR      BIG12        CIDB                    357 52    63.5
 DIR      BIG12        BIG6                     51 85    79.3
 DSET AH2
*DIR      REGINA       REF_EAST                  0  0     0.0
 DIR      REGINA       BIG9                    234 18    94.1
 DIR      REGINA       BIG12                   108 93    70.2
 DIR      REGINA       BIG11                   112 30    75.8
*DIR      REGINA       BIG8                    354  6    41.9         20
 DIR      REGINA       BIG7                     39 46    22.9
 DIR      REGINA       IGS                     107 53    39.5

*********************************************************************************************

*ZANG ZA  BIG1         REFERENCE_A             100  7    13.7
*ZANG ZA  BIG1         REFERENCE_B             100 10    55.6
 ZANG ZA  BIG1         BIG2                     99 61    21.6
 ZANG ZA  BIG1         IGS                      97 64    75.0
 ZANG ZA  BIG1         BAKO                    104 56    83.1
 ZANG ZA  BIG1         BIG3                    100 31    58.5
 ZANG ZA  BIG1         BIG4                    100 15    90.6
 ZANG ZA  BIG1         CIDB                     95 57    34.8
 ZANG ZA  BIG1         BIG5                    101 18    68.7

 ZANG ZA  BIG2         BIG3                    100 52    80.6
 ZANG ZA  BIG2         CIDB                     97  7    26.2
 ZANG ZA  BIG2         BIG1                    100 38    57.0
 ZANG ZA  BIG2         IGS                      96 90    66.0
 ZANG ZA  BIG2         BAKO                    108 20    13.1
 ZANG ZA  BIG2         BIG5                    100 71    60.0

*ZANG ZA  BIG3         REFERENCE_A              99 84    73.4
 ZANG ZA  BIG3         BIG2                     99 46    77.9
 ZANG ZA  BIG3         BIG4                     99 87    69.1
 ZANG ZA  BIG3         CIDB                     94 69    15.9
 ZANG ZA  BIG3         BIG1                     99 68    10.1

*ZANG ZA  BIG4         REFERENCE_B             100  4    73.2
 ZANG ZA  BIG4         BIG5                    100 45    17.0
 ZANG ZA  BIG4         BIG1                     99 83    93.0
 ZANG ZA  BIG4         BIG3                    100 11    93.6
 ZANG ZA  BIG4         CIDB                     87 59    21.5

 ZANG ZA  BIG5         BIG2                     99 28    11.6
 ZANG ZA  BIG5         BIG1                     98 80    97.3
 ZANG ZA  BIG5         BIG4                     99 54    46.5
 ZANG ZA  BIG5         CIDB                     93 61    38.1
 ZANG ZA  BIG5         IGS                      98 11    97.1

*********************************************************************************************

 ZANG ZA2 BIG6         BIG7                     99 88    56.1
 ZANG ZA2 BIG6         BIG12                   115 18    38.1
 ZANG ZA2 BIG6         BIG11                   118 64    60.6
 ZANG ZA2 BIG6         BIG9                    100 62    96.6
*ZANG ZA2 BIG6         CIDB                    109 51    92.3
 ZANG ZA2 BIG7         BIG8                    101  4    35.6
 ZANG ZA2 BIG7         REGINA_B                100 44     5.2
 ZANG ZA2 BIG7         REGINA                   99 95    80.1
 ZANG ZA2 BIG7         BIG6                    100 11     9.5
 ZANG ZA2 BIG8         BIG7                     98 95    31.6
 ZANG ZA2 BIG8         BIG6                     99 20    27.9
 ZANG ZA2 BIG8         REGINA                   94 42    14.0         25
```

```
 ZANG ZA2 BIG8         REGINA_B                  96 95    20.0
 ZANG ZA2 BIG9         REGINA                    97  4    59.5
 ZANG ZA2 BIG9         REGINA_B                  98 45    51.6
 ZANG ZA2 BIG9         BIG6                      99 36    85.4
 ZANG ZA2 BIG9         BIG10                    113  1    30.4
 ZANG ZA2 BIG10        BIG9                      86 98    43.2
 ZANG ZA2 BIG10        BIG12                     99 70    83.5
 ZANG ZA2 BIG10        IGS                       98 98    12.6
 ZANG ZA2 BIG10        BIG11                     97 52    96.8
 ZANG ZA2 BIG10        CIDB                      93 57    60.9
 ZANG ZA2 BIG11        REGINA                    86 50    25.8
 ZANG ZA2 BIG11        REGINA_B                  86 97    56.1
 ZANG ZA2 BIG11        BIG10                    102 46    46.4
 ZANG ZA2 BIG11        CIDB                      92 66    68.2
 ZANG ZA2 BIG11        BIG6                      81 34    94.7
 ZANG ZA2 BIG11        IGS                       99 44    34.0
 ZANG ZA2 BIG11        BIG12                    100 55    97.1
 ZANG ZA2 BIG12        REGINA                    91 20    47.7
 ZANG ZA2 BIG12        REGINA_B                  91 51    10.0
 ZANG ZA2 BIG12        BIG10                    100 28    84.6
 ZANG ZA2 BIG12        BIG11                     99 43    61.2
*ZANG ZA2 BIG12        IGS                       95 98    13.8         20
 ZANG ZA2 BIG12        CIDB                      95 53    16.5
 ZANG ZA2 BIG12        BIG6                      84 81    24.1
 ZANG ZA2 REGINA       BIG9                     102 94    83.4
 ZANG ZA2 REGINA       BIG12                    108 79    37.6
 ZANG ZA2 REGINA       BIG11                    113 49    48.7
 ZANG ZA2 REGINA       BIG8                     105 57    11.7         25
 ZANG ZA2 REGINA       BIG7                     100  3    98.4
 ZANG ZA2 REGINA       IGS                      107 45    66.9

*********************************************************************************************

*DIST DP  BIG1         REFERENCE_A                118.17295
*DIST DP  BIG1         REFERENCE_B                 97.0106
 DIST DP  BIG1         BIG2                        17.70929
 DIST DP  BIG1         BIG3                        20.15433
 DIST DP  BIG1         BIG4                        26.85244
 DIST DP  BIG1         BIG5                        12.42771

 DIST DP  BIG2         BIG3                        24.97741
 DIST DP  BIG2         BIG1                        17.71029
 DIST DP  BIG2         BIG5                        30.13250

*DIST DP  BIG3         REFERENCE_A                 79.24113
*DIST DP  BIG3         REFERENCE_A                138.3274
 DIST DP  BIG3         BIG2                        24.97693
 DIST DP  BIG3         BIG4                        17.51831
 DIST DP  BIG3         BIG1                        20.15485

*DIST DP  BIG4         REFERENCE_B                123.85500
 DIST DP  BIG4         BIG5                        23.11342
 DIST DP  BIG4         BIG1                        26.85299
 DIST DP  BIG4         BIG3                        17.51832

 DIST DP  BIG5         BIG2                        30.13258
 DIST DP  BIG5         BIG1                        12.42824
 DIST DP  BIG5         BIG4                        23.11344

*********************************************************************************************

 DIST DP  BIG6         BIG7                        25.66558
 DIST DP  BIG6         BIG12                       42.66496
 DIST DP  BIG6         BIG11                       34.08177
 DIST DP  BIG6         BIG9                        67.93653
 DIST DP  BIG7         BIG8                        46.07100
 DIST DP  BIG7         REGINA_B                    47.26652
 DIST DP  BIG7         REGINA                      47.26602
 DIST DP  BIG7         BIG6                        25.66556
 DIST DP  BIG8         BIG7                        46.06973
 DIST DP  BIG8         BIG6                        56.88171
 DIST DP  BIG8         REGINA                       8.99419
 DIST DP  BIG8         REGINA_B                     8.96969
 DIST DP  BIG9         REGINA                      16.16132
 DIST DP  BIG9         REGINA_B                    16.14782
 DIST DP  BIG9         BIG6                        67.93635
```

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 DIST DP  BIG9         BIG10                        47.16044
 DIST DP  BIG10        BIG9                         47.15990
 DIST DP  BIG10        BIG12                        36.47370
 DIST DP  BIG10        BIG11                        10.46920
 DIST DP  BIG11        REGINA                       47.13290
 DIST DP  BIG11        REGINA_B                     47.05840
 DIST DP  BIG11        BIG10                        10.46920
 DIST DP  BIG11        BIG6                         34.08115
 DIST DP  BIG11        BIG12                        27.15352
 DIST DP  BIG12        REGINA                       73.75947
*DIST DP  BIG12        REGINA_B                     73.70097
 DIST DP  BIG12        BIG10                        36.47373
 DIST DP  BIG12        BIG11                        27.15504
 DIST DP  BIG12        BIG6                         42.66385
 DIST DP  REGINA       BIG9                         16.16083
 DIST DP  REGINA       BIG12                        73.75852
 DIST DP  REGINA       BIG11                        47.13097
 DIST DP  REGINA       BIG8                          8.99719
 DIST DP  REGINA       BIG7                         47.26497

 HIST ALL Toutes les observations
 END
```

Appendix 6 : Local survey adjustment output file

```
================================================================================
          CIBG (INDONESIE) REGINA - CIDB  - IGS - OCTOBER 2015 SURVEY
Microsearch GeoLab, V2001.9.20.0             WGS 84      UNITS: m,GRAD Page 0001
================================================================================
Tue Dec 6 14:04:08 2016
 ------------------------------------------------------------------------------
|             PARAMETERS                |             OBSERVATIONS             |
|---------------------------------------------------------------------------|
|   Description     |      Number       |   Description     |      Number      |
|---------------------------------------------------------------------------|
| No. of Stations   |          19       | Directions        |          65      |
| Coord Parameters  |          57       | Distances         |          49      |
| Free Latitudes    |          19       | Azimuths          |           0      |
| Free Longitudes   |          19       | Vertical Angles   |           0      |
| Free Heights      |          19       | Zenithal Angles   |          66      |
| Fixed Coordinates|           0       | Angles            |           0      |
| Astro. Latitudes  |           0       | Heights           |           0      |
| Astro. Longitudes|           0       | Height Differences|           0      |
| Geoid Records     |           0       | Auxiliary Params. |           0      |
| All Aux. Pars.    |          13       | 2-D Coords.       |           0      |
| Direction Pars.   |          13       | 2-D Coord. Diffs. |           2      |
| Scale Parameters  |           0       | 3-D Coords.       |           3      |
| Constant Pars.    |           0       | 3-D Coord. Diffs. |           9      |
| Rotation Pars.    |           0       |                   |                  |
| Translation Pars.|           0       |                   |                  |
|                   |    --------       |                   |    --------      |
| Total Parameters  |          70       | Total Observations|         194      |
|---------------------------------------------------------------------------|
|                      Degrees of Freedom =       124                       |
 ------------------------------------------------------------------------------
--------------------------------------------------------------------------------
                       SUMMARY OF SELECTED OPTIONS
--------------------------------------------------------------------------------
    OPTION                                |   SELECTION
--------------------------------------------------------------------------------
    Computation Mode                      |   Adjustment
    Maximum Iterations                    |   15
    Convergence Criterion                 |   0.00010
    Residual Rejection Criterion          |   Tau Max
    Confidence Region Types               |   1D 2D 3D Station Relative
    Relative Confidence Regions           |   Connected Only
    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
================================================================================
          CIBG (INDONESIE) REGINA - CIDB  - IGS - OCTOBER 2015 SURVEY
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
--------------------------------------------------------------------------------
```

Adjusted PLH Coordinates:

CODE	FFF	STATION			LATITUDE STD DEV		LONGITUDE STD DEV	ELIP-HEIGHT STD DEV		
PLH	000	BAKO	S	6 29	27.79863 0.0011	E106 50	56.08642 0.0011	158.1262 0.0011	m	0
PLH	000	BIG1	S	6 29	27.42072 0.0024	E106 50	56.38789 0.0025	159.1940 0.0011	m	0
PLH	000	BIG10	S	6 29	26.44872 0.0028	E106 50	56.64857 0.0029	159.0221 0.0012	m	0
PLH	000	BIG11	S	6 29	26.67403 0.0027	E106 50	56.39328 0.0028	159.4277 0.0012	m	0
PLH	000	BIG12	S	6 29	27.51976 0.0028	E106 50	56.13630 0.0025	159.1882 0.0013	m	0
PLH	000	BIG2	S	6 29	27.99189 0.0024	E106 50	56.30974 0.0025	159.3016 0.0011	m	0
PLH	000	BIG3	S	6 29	27.42002 0.0027	E106 50	55.73194 0.0025	159.0935 0.0012	m	0
PLH	000	BIG4	S	6 29	26.84980 0.0027	E106 50	55.72609 0.0026	159.1268 0.0012	m	0
PLH	000	BIG5	S	6 29	27.02241 0.0024	E106 50	56.45826 0.0026	158.9620 0.0012	m	0
PLH	000	BIG6	S	6 29	27.03035 0.0030	E106 50	57.39370 0.0027	169.2691 0.0013	m	0
PLH	000	BIG7	S	6 29	26.48638 0.0034	E106 50	58.02770 0.0029	169.3145 0.0013	m	0
PLH	000	BIG8	S	6 29	25.18184 0.0030	E106 50	57.28850 0.0040	168.5582 0.0013	m	0
PLH	000	BIG9	S	6 29	24.94552 0.0028	E106 50	56.65658 0.0042	168.5959 0.0013	m	0
PLH	000	CIBG	S	6 29	25.31576 0.0031	E106 50	57.02944 0.0040	169.1039 0.0020	m	0
PLH	000	CIDB	S	6 29	26.46018 0.0027	E106 50	55.82928 0.0027	161.5712 0.0012	m	0
PLH	000	IGS	S	6 29	27.79863 0.0025	E106 50	56.08642 0.0025	159.7428 0.0012	m	0
PLH	000	REFERENCE_A	S	6 29	27.45556 0.0016	E106 51	0.23397 0.0016	159.0282 0.0177	m	0
PLH	000	REGINA	S	6 29	25.31576 0.0029	E106 50	57.02944 0.0038	169.3449 0.0013	m	0
PLH	000	REGINA_B	S	6 29	25.31577 0.0029	E106 50	57.02945 0.0038	168.9876 0.0013	m	0

Adjusted XYZ Coordinates:

CODE	FFF	STATION	X-COORDINATE STD DEV	Y-COORDINATE STD DEV	Z-COORDINATE STD DEV		
XYZ		BAKO	-1836969.3719 0.0011	6065616.9871 0.0011	-716257.8889 0.0011	m	0
XYZ		BIG1	-1836978.9249 0.0025	6065616.5737 0.0013	-716246.4748 0.0024	m	0
XYZ		BIG10	-1836987.5195 0.0028	6065617.3192 0.0015	-716216.7872 0.0028	m	0
XYZ		BIG11	-1836979.9024 0.0027	6065619.2296 0.0014	-716223.7101 0.0027	m	0
XYZ		BIG12	-1836971.4252 0.0024	6065618.4796 0.0014	-716249.4970 0.0028	m	0
XYZ		BIG2	-1836976.0830 0.0024	6065615.4736 0.0013	-716263.9207 0.0024	m	0
XYZ		BIG3	-1836959.6074 0.0025	6065622.3222 0.0013	-716246.4421 0.0027	m	0
XYZ		BIG4	-1836960.0187 0.0026	6065624.3012 0.0013	-716229.0412 0.0027	m	0
XYZ		BIG5	-1836981.3284 0.0025	6065617.0503 0.0013	-716234.2908 0.0024	m	0
XYZ		BIG6	-1837011.7972 0.0026	6065618.4942 0.0015	-716235.6985 0.0030	m	0
XYZ		BIG7	-1837031.0019 0.0028	6065614.6989 0.0016	-716219.1000 0.0034	m	0
XYZ		BIG8	-1837010.3596 0.0038	6065624.8986 0.0018	-716179.1961 0.0029	m	0
XYZ		BIG9	-1836992.0255 0.0040	6065631.3477 0.0018	-716171.9873 0.0028	m	0
XYZ		CIBG	-1837002.7637 0.0038	6065627.2797 0.0023	-716183.3456 0.0031	m	0
XYZ		CIDB	-1836964.1494 0.0027	6065627.0016 0.0014	-716217.4251 0.0027	m	0
XYZ		IGS	-1836969.8375 0.0024	6065618.5244 0.0013	-716258.0717 0.0025	m	0
XYZ		REFERENCE_A	-1837091.9434 0.0053	6065582.0463 0.0169	-716247.5193 0.0025	m	0
XYZ		REGINA	-1837002.8331 0.0036	6065627.5088 0.0017	-716183.3728 0.0028	m	0
XYZ		REGINA_B	-1837002.7305 0.0036	6065627.1690 0.0017	-716183.3328 0.0028	m	0

Residuals (critical value = 3.754, 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
XCT	BAKO				-1836969.37190	0.0000	0.0000
					0.0010	0.0000	*
YCT	BAKO				6065616.98710	0.0000	0.0000
					0.0011	0.0000	*
ZCT	BAKO				-716257.88890	0.0000	0.0000
					0.0007	0.0000	*
ELAT		IGS	BAKO	0 00	0.00000	-0.0000	-0.0005
					0.0020	0.0000	0.01
ELON		IGS	BAKO	0 00	0.00000	-0.0000	-0.0000
					0.0020	-0.0000	0.00
ELAT		REGINA	CIBG	0 00	0.00000	-0.0000	-0.0000
					0.0010	0.0000	0.00*
ELON		REGINA	CIBG	0 00	0.00000	0.0000	0.0000
					0.0010	0.0000	0.00*
EHGT		REGINA	CIBG		-0.24100	0.0000	0.0000
					0.0014	0.0000	0.00*
ELAT		REGINA	REGINA_B	0 00	0.00000	-0.0003	-0.3162
					0.0010	0.0010	860.98
ELON		REGINA	REGINA_B	0 00	0.00000	0.0003	0.3051
					0.0010	0.0009	809.51
EHGT		REGINA	REGINA_B		-0.35940	0.0021	1.5163
					0.0014	0.0014	5885.00
DXCT		BAKO	REFERENCE_A		-122.57150	0.0000	0.0000
					0.0053	0.0000	0.00*
DYCT		BAKO	REFERENCE_A		-34.94080	0.0000	0.0000
					0.0093	0.0000	0.00*
DZCT		BAKO	REFERENCE_A		10.36960	-0.0000	-0.0000
					0.0144	0.0000	0.00*
DIR		BIG1	REFERENCE_A	0 0	0.0	0.0	0.0
					8.0	0.0	*
DIR		BIG1	BIG2	108 8	20.4	-6.9	-1.5
					8.0	4.6	
DIR		BIG1	IGS	142 29	67.4	-2.8	-0.9
					8.0	3.3	
DIR		BIG1	BIG3	199 49	9.7	4.0	0.9
					8.0	4.6	
DIR		BIG1	BIG4	244 73	22.3	-0.4	-0.1
					8.0	5.2	
DIR		BIG1	CIDB	265 88	11.8	30.5	1.8
					17.9	16.7	
DIR		BIG1	BIG5	310 55	76.8	-0.0	-0.0
					8.0	4.5	
DIR		BIG2	BIG3	0 0	0.0	-2.3	-0.4
					8.0	5.1	
DIR		BIG2	CIDB	30 98	5.6	-1.1	-0.2
					8.0	6.3	
DIR		BIG2	BIG1	58 99	22.7	2.3	0.4
					8.0	6.0	
DIR		BIG2	IGS	395 74	29.9	0.4	0.8
					8.0	0.5	
DIR		BIG2	BIG5	60 1	34.8	0.6	0.1
					8.0	6.4	
DIR		BIG3	BIG2	49 37	94.1	4.3	1.0
					8.0	4.2	
DIR		BIG3	BIG4	299 5	75.9	30.4	2.2
					17.9	13.5	
DIR		BIG3	CIDB	306 15	46.0	-47.3	-2.0
					25.3	23.6	

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
DIR		BIG3	BIG1	399 78	31.5	-5.6	-1.3
					8.0	4.5	
DIR		BIG4	BIG5	367 93	87.6	-0.7	-0.2
					8.0	4.5	
DIR		BIG4	BIG1	398 51	14.3	2.1	0.5
					8.0	4.7	
DIR		BIG4	BIG3	52 55	1.8	-13.1	-0.9
					17.9	13.8	
DIR		BIG4	CIDB	269 68	87.9	1.2	0.9
					8.0	1.3	
DIR		BIG5	BIG2	0 0	0.0	4.9	0.8
					8.0	6.0	
DIR		BIG5	BIG1	1 45	63.7	-5.9	-1.0
					8.0	5.8	
DIR		BIG5	BIG4	105 5	74.9	-1.6	-0.4
					8.0	4.4	
DIR		BIG5	CIDB	136 75	17.6	-2.6	-1.0
					8.0	2.7	
DIR		BIG5	IGS	18 76	56.9	5.2	0.9
					8.0	6.0	
DIR		BIG6	BIG7	59 2	50.0	3.4	0.4
					12.0	7.7	
DIR		BIG6	BIG12	280 53	72.2	-1.5	-0.2
					12.0	8.9	
DIR		BIG6	BIG11	325 94	11.3	4.6	0.5
					12.0	9.7	
DIR		BIG6	BIG9	382 52	39.5	-1.5	-0.2
					12.0	9.7	
DIR		BIG6	CIDB	326 40	91.0	-5.0	-0.5
					12.0	9.8	
DIR		BIG7	BIG8	256 30	95.5	4.1	0.5
					12.0	8.9	
DIR		BIG7	REGINA_B	244 17	74.9	-5.2	-0.5
					12.0	9.6	
DIR		BIG7	REGINA	244 17	74.0	-4.6	-0.5
					12.0	9.8	
DIR		BIG7	BIG6	143 99	66.3	5.7	0.7
					12.0	7.7	
DIR		BIG8	BIG7	0 0	0.0	11.8	1.5
					12.0	7.8	
DIR		BIG8	BIG6	29 20	75.8	-13.1	-1.6
					12.0	8.2	
DIR		BIG8	REGINA	102 45	67.5	-1.1	-0.3
					12.0	3.9	
DIR		BIG8	REGINA_B	102 45	35.2	2.4	0.7
					12.0	3.6	
DIR		BIG9	REGINA	299 34	10.0	1.4	0.2
					12.0	8.4	
DIR		BIG9	REGINA_B	299 34	16.4	-4.4	-0.8
					12.0	5.7	
DIR		BIG9	BIG6	327 93	25.5	-1.7	-0.2
					12.0	9.1	
DIR		BIG9	BIG10	349 91	6.1	4.8	0.5
					12.0	8.8	
DIR		BIG10	BIG9	0 0	0.0	-10.5	-1.4
					12.0	7.5	
DIR		BIG10	BIG12	228 6	49.3	7.5	0.8
					12.0	9.5	
DIR		BIG10	IGS	224 78	27.4	15.0	1.6
					12.0	9.6	
DIR		BIG10	BIG11	253 63	26.3	-12.0	-1.5
					12.0	8.0	
DIR		BIG11	REGINA	0 0	0.0	-7.3	-0.7
					12.0	9.8	

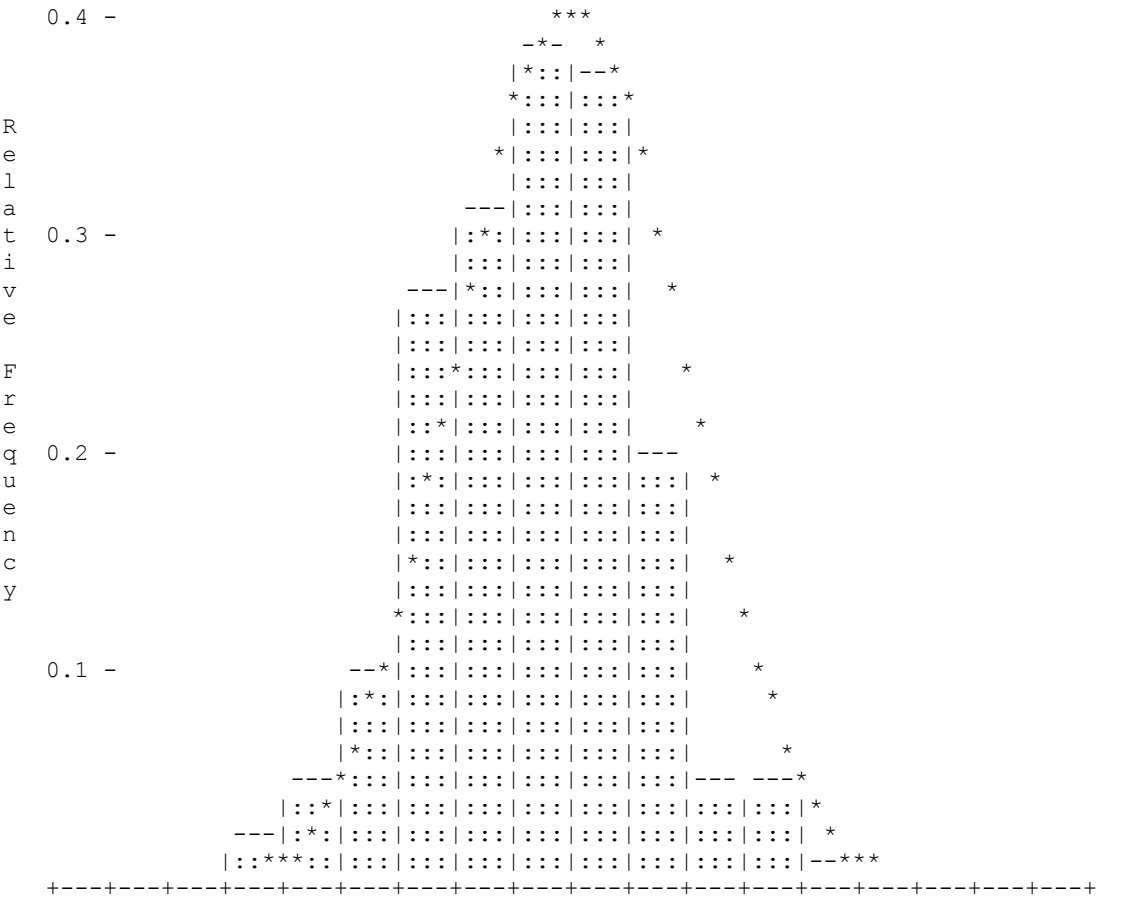
TYPE	AT	FROM	TO	OBSERVATION	STD DEV	RESIDUAL	STD RES	PPM
DIR		BIG11	REGINA_B	0	0	4.5	-6.3	-0.6
						12.0	9.7	
DIR		BIG11	BIG10	26	8	14.8	-0.1	-0.0
						12.0	7.5	
DIR		BIG11	CIDB	295	17	71.3	1.8	0.5
						12.0	3.7	
DIR		BIG11	BIG6	93	88	71.8	8.9	1.0
						12.0	8.8	
DIR		BIG11	IGS	189	7	65.4	-59.6	-2.7
						23.3	22.0	
DIR		BIG11	BIG12	190	89	6.6	18.7	2.2
						12.0	8.5	
DIR		BIG12	REGINA	0	0	0.0	-1.6	-0.1
						12.0	10.4	
DIR		BIG12	REGINA_B	399	99	98.1	3.7	0.4
						12.0	10.3	
DIR		BIG12	BIG10	3	88	97.8	13.9	1.4
						12.0	10.2	
DIR		BIG12	BIG11	394	27	9.0	-29.2	-3.0
						12.0	9.8	
DIR		BIG12	IGS	186	75	43.0	2.5	1.1
						12.0	2.2	
DIR		BIG12	CIDB	357	52	63.5	-0.0	-0.0
						12.0	1.2	
DIR		BIG12	BIG6	51	85	79.3	10.7	1.1
						12.0	9.7	
DIR		REGINA	BIG9	234	18	94.1	5.0	0.7
						12.0	6.8	
DIR		REGINA	BIG12	108	93	70.2	-17.6	-1.7
						12.0	10.3	
DIR		REGINA	BIG11	112	30	75.8	25.6	2.6
						12.0	10.0	
DIR		REGINA	BIG7	39	46	22.9	1.3	0.2
						12.0	8.7	
DIR		REGINA	IGS	107	53	39.5	-14.4	-1.4
						12.0	10.2	
ZANG		BIG1	BIG2	99	61	21.6	-10.0	-0.8
						14.0	12.7	
ZANG		BIG1	IGS	97	64	75.0	-8.6	-0.8
						14.0	11.2	
ZANG		BIG1	BAKO	104	56	83.1	-7.0	-0.7
						14.0	10.8	
ZANG		BIG1	BIG3	100	31	58.5	-15.0	-1.2
						14.0	12.4	
ZANG		BIG1	BIG4	100	15	90.6	-3.4	-0.3
						14.0	13.1	
ZANG		BIG1	CIDB	95	57	34.8	-4.7	-0.4
						14.0	13.2	
ZANG		BIG1	BIG5	101	18	68.7	-15.3	-1.3
						14.0	11.3	
ZANG		BIG2	BIG3	100	52	80.6	-24.2	-1.9
						14.0	12.7	
ZANG		BIG2	CIDB	97	7	26.2	1.6	0.1
						14.0	13.5	
ZANG		BIG2	BIG1	100	38	57.0	-13.2	-1.0
						14.0	12.7	
ZANG		BIG2	IGS	96	90	66.0	-0.7	-0.1
						14.0	7.4	
ZANG		BIG2	BAKO	108	20	13.1	4.3	0.7
						14.0	6.7	
ZANG		BIG2	BIG5	100	71	60.0	-16.9	-1.3
						14.0	13.3	
ZANG		BIG3	BIG2	99	46	77.9	-19.8	-1.6
						14.0	12.7	

TYPE	AT	FROM	TO	OBSERVATION	STD DEV	RESIDUAL	STD DEV	STD RES PPM
ZANG		BIG3	BIG4	99 87	69.1	-23.1		-2.0
					14.0	11.8		
ZANG		BIG3	CIDB	94 69	15.9	11.9		0.9
					14.0	12.8		
ZANG		BIG3	BIG1	99 68	10.1	-18.4		-1.5
					14.0	12.4		
ZANG		BIG4	BIG5	100 45	17.0	-23.1		-1.8
					14.0	12.6		
ZANG		BIG4	BIG1	99 83	93.0	-15.7		-1.2
					14.0	13.1		
ZANG		BIG4	BIG3	100 11	93.6	-16.0		-1.4
					14.0	11.8		
ZANG		BIG4	CIDB	87 59	21.5	4.8		0.6
					14.0	8.4		
ZANG		BIG5	BIG2	99 28	11.6	-14.6		-1.1
					14.0	13.3		
ZANG		BIG5	BIG1	98 80	97.3	-20.0		-1.8
					14.0	11.3		
ZANG		BIG5	BIG4	99 54	46.5	-15.7		-1.2
					14.0	12.6		
ZANG		BIG5	CIDB	93 61	38.1	8.7		0.7
					14.0	12.4		
ZANG		BIG5	IGS	98 11	97.1	-9.2		-0.7
					14.0	12.9		
ZANG		BIG6	BIG7	99 88	56.1	-18.3		-1.4
					16.0	12.7		
ZANG		BIG6	BIG12	115 18	38.1	-21.6		-1.5
					16.0	14.5		
ZANG		BIG6	BIG11	118 64	60.6	-28.3		-2.0
					16.0	14.1		
ZANG		BIG6	BIG9	100 62	96.6	-15.0		-1.0
					16.0	15.4		
ZANG		BIG7	BIG8	101 4	35.6	-18.0		-1.2
					16.0	14.8		
ZANG		BIG7	REGINA_B	100 44	5.2	-0.5		-0.0
					16.0	14.8		
ZANG		BIG7	REGINA	99 95	80.1	-13.2		-0.9
					16.0	14.8		
ZANG		BIG7	BIG6	100 11	9.5	-18.7		-1.5
					16.0	12.7		
ZANG		BIG8	BIG7	98 95	31.6	-19.4		-1.3
					16.0	14.8		
ZANG		BIG8	BIG6	99 20	27.9	-18.9		-1.2
					16.0	15.2		
ZANG		BIG8	REGINA	94 42	14.0	-37.3		-1.6
					29.7	24.1		
ZANG		BIG8	REGINA_B	96 95	20.0	3.1		0.5
					16.0	6.7		
ZANG		BIG9	REGINA	97 4	59.5	-27.0		-2.1
					16.0	12.8		
ZANG		BIG9	REGINA_B	98 45	51.6	-7.3		-0.7
					16.0	11.2		
ZANG		BIG9	BIG6	99 36	85.4	-9.8		-0.6
					16.0	15.4		
ZANG		BIG9	BIG10	113 1	30.4	-13.7		-0.9
					16.0	14.8		
ZANG		BIG10	BIG9	86 98	43.2	-17.4		-1.2
					16.0	14.8		
ZANG		BIG10	BIG12	99 70	83.5	-19.2		-1.3
					16.0	14.8		
ZANG		BIG10	IGS	98 98	12.6	23.8		1.6
					16.0	14.9		
ZANG		BIG10	BIG11	97 52	96.8	-30.9		-2.6
					16.0	12.1		

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
ZANG		BIG10	CIDB 93 57	60.9	-0.1	-0.0
				16.0	13.6	
ZANG		BIG11	REGINA 86 50	25.8	-15.5	-1.0
				16.0	15.0	
ZANG		BIG11	REGINA_B 86 97	56.1	-10.2	-0.7
				16.0	14.8	
ZANG		BIG11	BIG10 102 46	46.4	-27.0	-2.2
				16.0	12.1	
ZANG		BIG11	CIDB 92 66	68.2	-28.2	-2.4
				16.0	11.7	
ZANG		BIG11	BIG6 81 34	94.7	-19.7	-1.4
				16.0	14.1	
ZANG		BIG11	IGS 99 44	34.0	34.2	2.4
				16.0	14.4	
ZANG		BIG11	BIG12 100 55	97.1	-20.0	-1.4
				16.0	14.0	
ZANG		BIG12	REGINA 91 20	47.7	-12.9	-0.8
				16.0	15.5	
ZANG		BIG12	REGINA_B 91 51	10.0	-6.9	-0.4
				16.0	15.4	
ZANG		BIG12	BIG10 100 28	84.6	-16.3	-1.1
				16.0	14.8	
ZANG		BIG12	BIG11 99 43	61.2	-24.4	-1.7
				16.0	14.0	
ZANG		BIG12	CIDB 95 53	16.5	6.7	0.5
				16.0	13.9	
ZANG		BIG12	BIG6 84 81	24.1	-20.3	-1.4
				16.0	14.5	
ZANG		REGINA	BIG9 102 94	83.4	-31.7	-2.5
				16.0	12.8	
ZANG		REGINA	BIG12 108 79	37.6	-9.1	-0.6
				16.0	15.5	
ZANG		REGINA	BIG11 113 49	48.7	-14.7	-1.0
				16.0	15.0	
ZANG		REGINA	BIG8 105 57	11.7	-37.9	-1.6
				29.7	24.1	
ZANG		REGINA	BIG7 100 3	98.4	-13.1	-0.9
				16.0	14.8	
ZANG		REGINA	IGS 107 45	66.9	-14.7	-1.0
				16.0	15.4	
DIST		BIG1	BIG2	17.70920	0.0008	0.8508
				0.0010	0.0009	45.32
DIST		BIG1	BIG3	20.15430	0.0005	0.4745
				0.0010	0.0010	22.37
DIST		BIG1	BIG4	26.85240	0.0008	0.8678
				0.0010	0.0009	30.02
DIST		BIG1	BIG5	12.42770	0.0002	0.2583
				0.0010	0.0010	19.78
DIST		BIG2	BIG3	24.97740	-0.0004	-0.4452
				0.0010	0.0009	16.43
DIST		BIG2	BIG1	17.71020	-0.0002	-0.2091
				0.0010	0.0009	11.14
DIST		BIG2	BIG5	30.13250	-0.0007	-0.7181
				0.0010	0.0009	21.71
DIST		BIG3	BIG2	24.97690	0.0001	0.0973
				0.0010	0.0009	3.59
DIST		BIG3	BIG4	17.51830	-0.0003	-0.3388
				0.0010	0.0009	18.11
DIST		BIG3	BIG1	20.15480	-0.0000	-0.0516
				0.0010	0.0010	2.43
DIST		BIG4	BIG5	23.11340	0.0002	0.2321
				0.0010	0.0009	9.39
DIST		BIG4	BIG1	26.85290	0.0003	0.3295
				0.0010	0.0009	11.40

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
DIST		BIG4	BIG3	17.51830	-0.0003	-0.3388
				0.0010	0.0009	18.11
DIST		BIG5	BIG2	30.13250	-0.0007	-0.7181
				0.0010	0.0009	21.71
DIST		BIG5	BIG1	12.42820	-0.0003	-0.2671
				0.0010	0.0010	20.45
DIST		BIG5	BIG4	23.11340	0.0002	0.2321
				0.0010	0.0009	9.39
DIST		BIG6	BIG7	25.66550	0.0003	0.3642
				0.0010	0.0009	12.12
DIST		BIG6	BIG12	42.66490	-0.0000	-0.0092
				0.0010	0.0009	0.19
DIST		BIG6	BIG11	34.08170	-0.0003	-0.3778
				0.0010	0.0009	10.18
DIST		BIG6	BIG9	67.93650	-0.0009	-1.0100
				0.0010	0.0009	13.44
DIST		BIG7	BIG8	46.07100	-0.0009	-0.9287
				0.0010	0.0009	18.47
DIST		BIG7	REGINA_B	47.26650	-0.0005	-0.5769
				0.0010	0.0009	11.20
DIST		BIG7	REGINA	47.26600	-0.0007	-0.7869
				0.0010	0.0009	15.39
DIST		BIG7	BIG6	25.66550	0.0003	0.3642
				0.0010	0.0009	12.12
DIST		BIG8	BIG7	46.06970	0.0004	0.4899
				0.0010	0.0009	9.74
DIST		BIG8	BIG6	56.88170	0.0006	0.6725
				0.0010	0.0009	10.87
DIST		BIG8	REGINA	8.99410	0.0006	0.7505
				0.0010	0.0009	71.69
DIST		BIG8	REGINA_B	8.96960	0.0008	1.0044
				0.0010	0.0008	94.11
DIST		BIG9	REGINA	16.16130	-0.0005	-0.5796
				0.0010	0.0009	32.12
DIST		BIG9	REGINA_B	16.14780	0.0008	0.8926
				0.0010	0.0009	48.82
DIST		BIG9	BIG6	67.93630	-0.0007	-0.7887
				0.0010	0.0009	10.49
DIST		BIG9	BIG10	47.16040	0.0003	0.3204
				0.0010	0.0009	6.06
DIST		BIG10	BIG9	47.15990	0.0008	0.8812
				0.0010	0.0009	16.66
DIST		BIG10	BIG12	36.47370	-0.0004	-0.4158
				0.0010	0.0009	10.13
DIST		BIG10	BIG11	10.46920	-0.0003	-0.3839
				0.0010	0.0009	32.82
DIST		BIG11	REGINA	47.13290	-0.0006	-0.6317
				0.0010	0.0009	12.38
DIST		BIG11	REGINA_B	47.05840	-0.0001	-0.1330
				0.0010	0.0009	2.56
DIST		BIG11	BIG10	10.46920	-0.0003	-0.3839
				0.0010	0.0009	32.82
DIST		BIG11	BIG6	34.08110	0.0003	0.2756
				0.0010	0.0009	7.43
DIST		BIG11	BIG12	27.15350	0.0014	1.5329
				0.0010	0.0009	51.69
DIST		BIG12	REGINA	73.75940	-0.0004	-0.4934
				0.0010	0.0009	6.04
DIST		BIG12	BIG10	36.47370	-0.0004	-0.4158
				0.0010	0.0009	10.13
DIST		BIG12	BIG11	27.15500	-0.0001	-0.1053
				0.0010	0.0009	3.55
DIST		BIG12	BIG6	42.66380	0.0011	1.2342
				0.0010	0.0009	25.59

TYPE	AT	FROM	TO	OBSERVATION STD DEV	RESIDUAL STD DEV	STD RES PPM
DIST		REGINA	BIG9	16.16080	-0.0000	-0.0213
				0.0010	0.0009	1.18
DIST		REGINA	BIG12	73.75850	0.0005	0.5026
				0.0010	0.0009	6.16
DIST		REGINA	BIG11	47.13090	0.0014	1.5335
				0.0010	0.0009	30.05
DIST		REGINA	BIG8	8.99710	-0.0024	-2.7411
				0.0010	0.0009	261.83
DIST		REGINA	BIG7	47.26490	0.0004	0.4033
				0.0010	0.0009	7.89



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	3.7395
Number of Flagged Residuals	0
Convergence Criterion	0.0001
Final Iteration Counter Value	9
Confidence Level Used	95.0000
Estimated Variance Factor	1.2533
Number of Degrees of Freedom	124

Chi-Square Test on the Variance Factor:
9.9166e-01 < 1.0000 < 1.6347e+00 ?
THE TEST PASSES

NOTE: All confidence regions were computed using the following factors:

Variance factor used	1.2533
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.

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

STATION	MAJOR SEMI-AXIS	AZ	MINOR SEMI-AXIS	VERTICAL
BAKO	0.0027	90	0.0027	0.0022
BIG1	0.0063	66	0.0057	0.0022
BIG10	0.0071	88	0.0068	0.0024
BIG11	0.0069	62	0.0065	0.0024
BIG12	0.0069	15	0.0061	0.0025
BIG2	0.0062	111	0.0058	0.0022
BIG3	0.0067	25	0.0061	0.0023
BIG4	0.0072	40	0.0059	0.0023
BIG5	0.0065	62	0.0056	0.0023
BIG6	0.0074	166	0.0065	0.0025
BIG7	0.0088	152	0.0067	0.0026
BIG8	0.0100	110	0.0068	0.0026
BIG9	0.0102	94	0.0068	0.0025
CIBG	0.0098	105	0.0073	0.0040
CIDB	0.0074	45	0.0058	0.0023
IGS	0.0061	90	0.0061	0.0023
REFERENCE_A	0.0039	90	0.0039	0.0348
REGINA	0.0094	105	0.0068	0.0025
REGINA_B	0.0094	105	0.0068	0.0026

3D Station Confidence Regions (95.000 percent):

STATION	MAJ-SEMI (AZ,VANG)	MED-SEMI (AZ,VANG)	MIN-SEMI (AZ,VANG)
BAKO	0.0031 (104, 90)	0.0031 (298, 0)	0.0031 (208, 0)
BIG1	0.0072 (66, 0)	0.0065 (156, 0)	0.0032 (314, 90)
BIG10	0.0082 (88, 0)	0.0077 (178, 0)	0.0034 (296, 90)
BIG11	0.0079 (62, 0)	0.0074 (152, 0)	0.0034 (290, 90)
BIG12	0.0079 (15, 0)	0.0070 (105, 0)	0.0035 (281, 90)
BIG2	0.0071 (291, 0)	0.0067 (201, 0)	0.0032 (38, 90)
BIG3	0.0077 (25, 0)	0.0070 (115, 0)	0.0032 (232, 90)
BIG4	0.0082 (40, 0)	0.0067 (130, 0)	0.0033 (262, 90)
BIG5	0.0075 (62, 0)	0.0064 (152, 0)	0.0032 (306, 90)
BIG6	0.0084 (166, 0)	0.0074 (76, 0)	0.0036 (324, 90)
BIG7	0.0100 (152, 0)	0.0076 (62, 0)	0.0037 (320, 90)
BIG8	0.0114 (110, 0)	0.0078 (200, 0)	0.0036 (302, 90)
BIG9	0.0116 (94, 0)	0.0077 (184, 0)	0.0036 (292, 90)
CIBG	0.0112 (105, 0)	0.0084 (195, 0)	0.0057 (299, 90)
CIDB	0.0085 (45, 0)	0.0067 (135, 0)	0.0033 (276, 90)
IGS	0.0070 (104, 0)	0.0070 (194, 0)	0.0032 (296, 90)
REFERENCE_A	0.0496 (265, 90)	0.0044 (88, 0)	0.0044 (358, 0)
REGINA	0.0108 (105, 0)	0.0078 (195, 0)	0.0036 (298, 90)
REGINA_B	0.0108 (105, 0)	0.0078 (195, 0)	0.0036 (298, 90)

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
BAKO	BIG1	0.0057	66	0.0050	0.0005	14.8900	380.63
BAKO	BIG2	0.0056	111	0.0052	0.0004	9.1494	609.15
BAKO	IGS	0.0055	90	0.0055	0.0005	1.6166	3390.16
BAKO	REFERENCE_A	0.0027	90	0.0027	0.0347	127.8756	21.43
BIG1	BIG2	0.0012	84	0.0009	0.0004	17.7100	65.81
BIG1	BIG3	0.0013	174	0.0008	0.0005	20.1548	64.47
BIG1	BIG4	0.0017	40	0.0010	0.0005	26.8532	63.40
BIG1	BIG5	0.0009	155	0.0008	0.0004	12.4279	70.45
BIG1	CIDB	0.0022	49	0.0016	0.0006	34.2191	64.39
BIG1	IGS	0.0010	121	0.0008	0.0004	14.8618	64.83
BIG1	REFERENCE_A	0.0063	65	0.0056	0.0347	118.1796	53.49
BIG10	BIG11	0.0012	27	0.0011	0.0004	10.4689	118.89
BIG10	BIG12	0.0034	113	0.0012	0.0008	36.4733	94.51
BIG10	BIG9	0.0047	90	0.0013	0.0010	47.1607	100.03
BIG10	CIDB	0.0041	150	0.0016	0.0007	25.3045	162.77
BIG10	IGS	0.0050	140	0.0023	0.0009	44.9279	110.26
BIG11	BIG12	0.0026	100	0.0011	0.0007	27.1549	96.61
BIG11	BIG6	0.0034	21	0.0011	0.0009	34.0814	98.78
BIG11	CIDB	0.0032	147	0.0013	0.0007	18.6564	170.38
BIG11	IGS	0.0040	139	0.0020	0.0009	35.8123	110.93
BIG11	REGINA	0.0046	116	0.0011	0.0009	47.1323	97.03
BIG11	REGINA_B	0.0046	116	0.0012	0.0010	47.0583	97.40
BIG12	BIG6	0.0039	159	0.0013	0.0010	42.6649	91.97
BIG12	CIDB	0.0027	28	0.0020	0.0009	33.9731	80.82
BIG12	IGS	0.0032	3	0.0007	0.0011	8.7206	362.45
BIG12	REGINA	0.0070	111	0.0012	0.0011	73.7590	94.78
BIG12	REGINA_B	0.0070	111	0.0013	0.0011	73.7104	94.94
BIG2	BIG3	0.0017	38	0.0011	0.0005	24.9770	68.03
BIG2	BIG5	0.0019	97	0.0011	0.0004	30.1318	62.10
BIG2	CIDB	0.0031	69	0.0019	0.0006	49.3675	63.13
BIG2	IGS	0.0007	121	0.0007	0.0004	9.0843	79.38
BIG3	BIG4	0.0014	100	0.0009	0.0005	17.5180	77.50
BIG3	CIDB	0.0021	114	0.0016	0.0006	29.7408	70.06
BIG4	BIG5	0.0016	10	0.0010	0.0005	23.1136	67.69
BIG4	CIDB	0.0014	179	0.0009	0.0005	12.6209	113.70
BIG5	CIDB	0.0019	19	0.0013	0.0006	26.0499	73.60
BIG5	IGS	0.0017	116	0.0010	0.0005	26.4526	63.35
BIG6	BIG7	0.0027	143	0.0014	0.0009	25.6658	104.48
BIG6	BIG8	0.0058	86	0.0011	0.0010	56.8823	102.23
BIG6	BIG9	0.0068	71	0.0012	0.0010	67.9356	99.40
BIG6	CIDB	0.0057	178	0.0020	0.0011	51.7359	110.29
BIG7	BIG8	0.0049	61	0.0011	0.0010	46.0701	105.85
BIG7	REGINA	0.0048	49	0.0010	0.0010	47.2653	102.41
BIG7	REGINA_B	0.0049	49	0.0011	0.0010	47.2660	103.18
BIG8	REGINA	0.0014	82	0.0010	0.0005	8.9947	160.86
BIG8	REGINA_B	0.0015	79	0.0010	0.0004	8.9704	169.18
BIG9	REGINA	0.0017	49	0.0012	0.0005	16.1608	106.55
BIG9	REGINA_B	0.0019	54	0.0013	0.0006	16.1486	114.76
CIBG	REGINA	0.0027	0	0.0027	0.0031	0.2410	11370.39
CIBG	REGINA_B	0.0029	70	0.0028	0.0032	0.1163	24806.58
IGS	REGINA	0.0082	124	0.0024	0.0012	82.1544	100.06
REGINA	REGINA_B	0.0009	70	0.0006	0.0006	0.3573	2525.03

3D Relative Confidence Regions (95.000 percent):

FROM	TO	MAJ-SEMI(AZ,VANG)	MED-SEMI(AZ,VANG)	MIN-SEMI(AZ,VANG)
			DISTANCE	PPM
BAKO	BIG1	0.0065 (66, 0)	0.0057 (156, 0)	0.0007 (302,90)
			14.8900	434.70
BAKO	BIG2	0.0064 (111, 0)	0.0059 (201, 0)	0.0006 (295,90)
			9.1494	695.69
BAKO	IGS	0.0063 (101, 0)	0.0063 (191, 0)	0.0007 (296,90)
			1.6166	3871.78
BAKO	REFERENCE_A	0.0495 (265,90)	0.0031 (85, 0)	0.0031 (355, 0)
			127.8756	386.96
BIG1	BIG2	0.0013 (264, 0)	0.0010 (354, 0)	0.0005 (110,90)
			17.7100	75.16
BIG1	BIG3	0.0015 (174, 0)	0.0010 (264, 0)	0.0006 (12,90)
			20.1548	73.63
BIG1	BIG4	0.0019 (220, 0)	0.0012 (130, 0)	0.0007 (40,90)
			26.8532	72.41
BIG1	BIG5	0.0010 (335, 0)	0.0009 (245, 0)	0.0005 (91,90)
			12.4279	80.46
BIG1	CIDB	0.0025 (229, 0)	0.0019 (319, 0)	0.0008 (64,90)
			34.2191	73.54
BIG1	IGS	0.0011 (121, 0)	0.0009 (211, 0)	0.0006 (314,90)
			14.8618	74.04
BIG1	REFERENCE_A	0.0495 (266,90)	0.0072 (65, 0)	0.0064 (155, 0)
			118.1796	418.74
BIG10	BIG11	0.0014 (27, 0)	0.0012 (297, 0)	0.0005 (133,90)
			10.4689	135.78
BIG10	BIG12	0.0039 (293, 0)	0.0014 (23, 0)	0.0011 (140,90)
			36.4733	107.93
BIG10	BIG9	0.0054 (90, 0)	0.0014 (180, 0)	0.0014 (337,90)
			47.1607	114.24
BIG10	CIDB	0.0047 (330, 0)	0.0018 (60, 0)	0.0011 (231,90)
			25.3045	185.89
BIG10	IGS	0.0057 (140, 0)	0.0026 (50, 0)	0.0013 (249,90)
			44.9279	125.92
BIG11	BIG12	0.0030 (280, 0)	0.0012 (10, 0)	0.0010 (150,90)
			27.1549	110.34
BIG11	BIG6	0.0038 (201, 0)	0.0013 (75,90)	0.0013 (291, 0)
			34.0814	112.81
BIG11	CIDB	0.0036 (327, 0)	0.0015 (57, 0)	0.0010 (233,90)
			18.6564	194.59
BIG11	IGS	0.0045 (139, 0)	0.0023 (49, 0)	0.0012 (246,90)
			35.8123	126.69
BIG11	REGINA	0.0052 (296, 0)	0.0013 (198,90)	0.0012 (26, 0)
			47.1323	110.81
BIG11	REGINA_B	0.0052 (296, 0)	0.0014 (205,90)	0.0013 (26, 0)
			47.0583	111.24
BIG12	BIG6	0.0045 (159, 0)	0.0015 (249, 0)	0.0014 (44,90)
			42.6649	105.04
BIG12	CIDB	0.0031 (28, 0)	0.0023 (118, 0)	0.0013 (279,90)
			33.9731	92.30
BIG12	IGS	0.0036 (183, 0)	0.0015 (90,90)	0.0009 (273, 0)
			8.7206	413.94
BIG12	REGINA	0.0080 (291, 0)	0.0015 (187,90)	0.0013 (21, 0)
			73.7590	108.24
BIG12	REGINA_B	0.0080 (111, 0)	0.0016 (201,90)	0.0015 (21, 0)
			73.7104	108.43
BIG2	BIG3	0.0019 (218, 0)	0.0012 (308, 0)	0.0007 (60,90)
			24.9770	77.69
BIG2	BIG5	0.0021 (277, 0)	0.0013 (7, 0)	0.0006 (103,90)
			30.1318	70.93
BIG2	CIDB	0.0036 (249, 0)	0.0022 (339, 0)	0.0009 (77,90)
			49.3675	72.10

BIG2	IGS	0.0008 (301, 0)	0.0007 (211, 0)	0.0005 (38,90)
			9.0843	90.65
BIG3	BIG4	0.0016 (280, 0)	0.0011 (190, 0)	0.0007 (73,90)
			17.5180	88.51
BIG3	CIDB	0.0024 (294, 0)	0.0018 (204, 0)	0.0008 (73,90)
			29.7408	80.01
BIG4	BIG5	0.0018 (10, 0)	0.0011 (100, 0)	0.0007 (206,90)
			23.1136	77.31
BIG4	CIDB	0.0016 (179, 0)	0.0010 (89, 0)	0.0007 (275,90)
			12.6209	129.85
BIG5	CIDB	0.0022 (19, 0)	0.0015 (109, 0)	0.0008 (250,90)
			26.0499	84.05
BIG5	IGS	0.0019 (116, 0)	0.0012 (26, 0)	0.0007 (294,90)
			26.4526	72.35
BIG6	BIG7	0.0031 (143, 0)	0.0016 (53, 0)	0.0012 (294,90)
			25.6658	119.32
BIG6	BIG8	0.0066 (86, 0)	0.0014 (351,90)	0.0012 (176, 0)
			56.8823	116.76
BIG6	BIG9	0.0077 (251, 0)	0.0015 (354,90)	0.0013 (161, 0)
			67.9356	113.52
BIG6	CIDB	0.0065 (178, 0)	0.0023 (268, 0)	0.0016 (48,90)
			51.7359	125.96
BIG7	BIG8	0.0056 (61, 0)	0.0014 (326,90)	0.0013 (151, 0)
			46.0701	120.89
BIG7	REGINA	0.0055 (229, 0)	0.0014 (321,90)	0.0012 (139, 0)
			47.2653	116.96
BIG7	REGINA_B	0.0056 (49, 0)	0.0014 (319,90)	0.0012 (139, 0)
			47.2660	117.83
BIG8	REGINA	0.0017 (262, 0)	0.0012 (352, 0)	0.0008 (136,90)
			8.9947	183.72
BIG8	REGINA_B	0.0017 (259, 0)	0.0012 (349, 0)	0.0006 (131,90)
			8.9704	193.22
BIG9	REGINA	0.0020 (49, 0)	0.0014 (319, 0)	0.0008 (143,90)
			16.1608	121.69
BIG9	REGINA_B	0.0021 (234, 0)	0.0014 (324, 0)	0.0009 (120,90)
			16.1486	131.06
CIBG	REGINA	0.0044 (309,90)	0.0031 (86, 0)	0.0031 (176, 0)
			0.2410	18364.56
CIBG	REGINA_B	0.0045 (308,90)	0.0033 (70, 0)	0.0032 (160, 0)
			0.1163	38782.56
IGS	REGINA	0.0094 (304, 0)	0.0027 (34, 0)	0.0017 (195,90)
			82.1544	114.27
REGINA	REGINA_B	0.0010 (250, 0)	0.0009 (34,90)	0.0007 (160, 0)
			0.3573	2883.74

Appendix 7 : Results at SINEX format

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%=SNX 1.00 IGN 16:341:00000 IGN 15:285:00000 15:285:00000 C 00009
*-------------------------------------------------------------------------------
+FILE/COMMENT
* File created by geotosnx software (Z.Altamimi)
* Original input file: CIBG.cov
* Matrix Scalling Factor used:         1.0000000000
-FILE/COMMENT
*-------------------------------------------------------------------------------
+SITE/ID
*CODE PT __DOMES__ T _STATION DESCRIPTION__ APPROX_LON_ APPROX_LAT_ _APP_H_
 BAKO  A 23101M002                         106 50 56.0  -6 29 27.7   158.1
 CIDB  A 23101S003                         106 50 55.8  -6 29 26.4   161.6
 CIBG  A 23101M005                         106 50 57.0  -6 29 25.3   169.1
-SITE/ID
*-------------------------------------------------------------------------------
+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   BAKO  A    1 15:285:00000 m    2 -.183696937190000E+07 0.11195E-02
     2 STAY   BAKO  A    1 15:285:00000 m    2 0.606561698710000E+07 0.11195E-02
     3 STAZ   BAKO  A    1 15:285:00000 m    2 -.716257888900000E+06 0.11195E-02
     4 STAX   CIDB  A    1 15:285:00000 m    2 -.183696414940000E+07 0.12009E-02
     5 STAY   CIDB  A    1 15:285:00000 m    2 0.606562700160000E+07 0.29066E-02
     6 STAZ   CIDB  A    1 15:285:00000 m    2 -.716217425100000E+06 0.25344E-02
     7 STAX   CIBG  A    1 15:285:00000 m    2 -.183700276370000E+07 0.20811E-02
     8 STAY   CIBG  A    1 15:285:00000 m    2 0.606562727970000E+07 0.29912E-02
     9 STAZ   CIBG  A    1 15:285:00000 m    2 -.716183345600000E+06 0.39936E-02
-SOLUTION/ESTIMATE
*-------------------------------------------------------------------------------
+SOLUTION/MATRIX_ESTIMATE L COVA
*PARA1 PARA2 ____PARA2+0__________ ____PARA2+1__________ ____PARA2+2__________
     1     1 0.125328957905233E-05
     2     1 0.528615134201297E-19 0.125328957904607E-05
     3     1 -.457188605295226E-18 0.465027733486300E-18 0.125328957904836E-05
     4     1 0.125329032574734E-05 -.211034235848763E-13 -.854290676224684E-13
     4     4 0.144212726152383E-05
     5     1 -.333893319520256E-12 0.125328953895852E-05 0.192889169197683E-12
     5     4 -.166921983764315E-06 0.844831633887218E-05
     6     1 0.587247526731142E-12 -.185490072434958E-12 0.125328950805063E-05
     6     4 0.574143458527631E-06 -.146716927995629E-05 0.642327421028440E-05
     7     1 0.125329193429027E-05 0.176586353260021E-14 -.235089718050060E-12
     7     4 0.143206499314668E-05 -.121022354757939E-06 0.656909054226567E-06
     7     7 0.433088129617018E-05
     8     1 0.253109124050400E-13 0.125329078235538E-05 -.680435931977537E-12
     8     4 -.405376897309084E-06 0.725362119803441E-05 -.356308535829631E-05
     8     7 -.265053014529618E-07 0.894754022880258E-05
     9     1 0.124229205791460E-11 0.155261045442364E-13 0.125328972662429E-05
     9     4 0.656908249526805E-06 -.106373532303372E-05 0.713126249733571E-05
     9     7 0.133913413209105E-05 -.232971052048281E-06 0.159489261035635E-04
-SOLUTION/MATRIX_ESTIMATE L COVA
%ENDSNX
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