Scholars Journal of Engineering and Technology (SJET)
Abbreviated Key Title: Sch. J. Eng. Tech.
ISSN 2347-9523 (Print)
ISSN 2321-435X (Online)

A Unit of Scholars Academic and Scientific Society, India
www.saspublishers.com

Determination of Transformation Parameters between Global and Local Geodetic Network in Iraq (Itrf00)

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Original Research Article

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Article History
Received: 14.01.2018
Accepted: 24.01.2018
Published: 30.01.2018

DOI:
10.36347/sjet.2018.v06i01.004

Abstract: Due to the evolution of global positioning technologies through satellites and global coordinate system appears as a database that is dependable in all engineering fields, that spatial data (maps, networks, engineering projects). Iraq has no (datum) conjointly with the global system but local, therefore the need to link the local coordinate system (reference ellipsoid (Clarke 1880)) with (WGS 84) .It is difficult to use modern equipments in engineering projects , planning and satellite images Built on the basis of global systems (WGS84). The process of linking the two systems requires data in both systems it needs the coordinates of the national network of Geodetic (Clarke 1880) and the coordinates of the same points in the global system (WGS84) that are monitored in some way Geodetic Model using DGPS to synchronize with at least three CORS stations, and special software to get accurate coordinates. Ten selected sectors (100 * 100) km chosen around the area of Iraq ,four ground control points on each sector are observed on both local coordinates system(Clarke 1880,ITRF00) using (Adjust program) software to calculate the parameters of transformation between two systems by(Helmert Method/7-parameters) .In order to check the accuracy of these parameters another control point(5th one) which coordinates prevesouly observed by GPS technich(ITRFOO) can be transfere to local system using above seven-parameters and compared the results. By applying the equations (Helmert Method/7-parameters) has access to accurate results up to (0.01-0.002) m.
Keywords: Hidden Web Crawler, Query Optimization, Search engines, Metadata, document frequency, term weights.

INTRODUCTION

In Iraq, a local network was established by (Pole service company) from 1974-1979. It was built on the basis of Ellipsoid (Clarke 1880), This network is a type of trilateration, which is a first class, where (2780 points) horizontal Including (50 points) Laplace point, which was monitored astronomically and distributed on the territory of Iraq and not to exceed the distance between one point and another more than 200 km [1], and the mean of distances between a point and another between (8-35) km and a mean of 15 km and an average area between (140 – 160) sq.km, a relative error (1/650000). The AGA-8 was used to measure distance and accuracy (5 mm to +2.1 -6 D). This network covered all of Iraq and relied on production the maps and all the strategic projects are therefore the basis for accreditation in all engineering fields [2].In this study, could be calculated the seven-parameters translation using the(Helmert method 7-parameters), for use in the geocenter account of the local surface ellipsoid (Clarke 1880) and determine the relationship between the local (Clare1880) and global (WGS84/ITRF00)system for each sector (100 * 100) km, and to take advantage of these coefficients to convert the geodetic coordinates of the points in each sector. For points outside the sectors, the coefficients of the substitution can be calculated if they are between two sectors using the smoothing by interpolation Method.

STATE OF OBJECTIVE

The aim of this study is to find the realation ship between the local coordinates system (Clarke1880) and the global coordinates system(ITRF00) using (helmert 7-parameters) and (Adjust program) software and determined the geocenter location of reference ellipsoid (Clarke1880) due to global (ITRF00).

STATEMENT OF PROBLEM

The National Geodetic Network that was implemented during the last century has been relied on in general in the establishment of maps and all the strategic projects of Iraq, which is dependent on a local datum (Clarke 1880), Therefore, it is not possible to take advantage of the satellite images and coordinates obtained from the modern devices (GPS) unless the relationship between the two systems is known. Note that the techniques and devices (DGPS and GIS) do not have any Datum for Iraq directs.

MATERIALS AND METHODS

In this study, the final report of coordinates was used by the national geodetic network of the selected points, the observations of the same selected points using the (DGPS) in synchronized with the three CORS stations of the correction of data, using the Topcon Tools program and obtaining the corrected final coordinates and the Adjust program for the calculation of seven-parameters of Helmert method. The three-dimensional conformal coordinate transformation (helmert7-parameters) is also known as the seven-parameter similarity transformation. It is one of the most commonly used transformation methods in geodetic system and surveying, which preserves shape, so angles are not changed The three-dimensional conformal coordinate transformation involves seven parameters (three rotations,three translations, and one scale factor), 3D translation is the shift in origin of one coordinate system to the other, as shown in (Table-3) [4, 5].

AREA OF STUDY

The area of study with (fifty points) is covered between latitude line (43°00'-48°00'N) and longitude line (29°00'-33°00'E), which includes the governorates (Basrah, Muthanna, Najaf) and it is Surrounded three CORS stations; Baghdad CORS station (ISBS), Najaf CORS station (ISNA) and Basrah CORS station (ISBS). Where all selected points and CORS stations are located in (Zone 38), as shown in Figure-1.

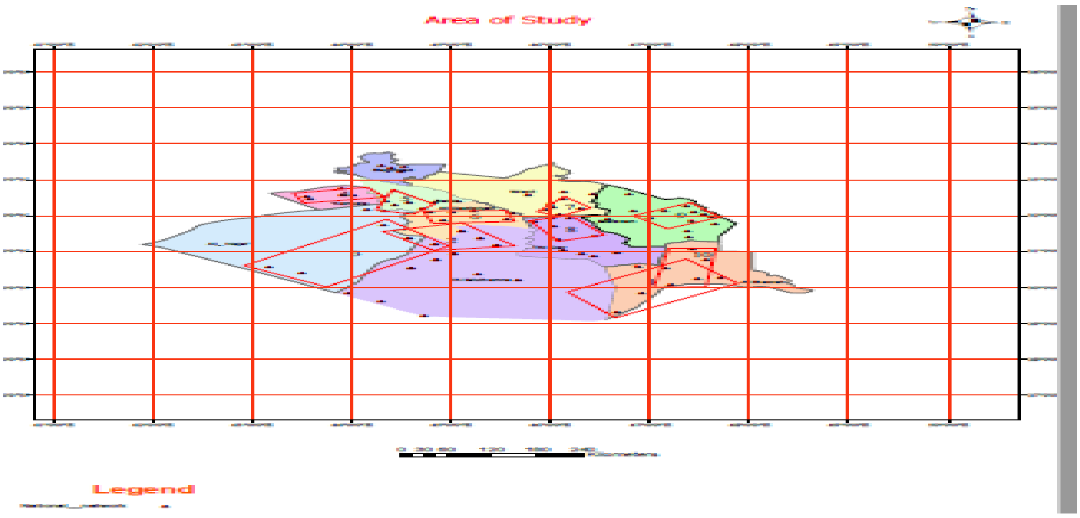

Fig-1: Study of the Area

EXPEREMAINTAL OF WORK

National Geodetic Network reports, data collected for geodetic coordinate system (Clarke 1880) and monitoring the way Double Difference global WGS84/ITRF00) to the same points in synchronized with three CORS stations for the ten sectors, as shown in the Table-1.

Table-1: Geodetic coordinates for selected points in local and global systems

		CLARKE 1880		WGS84/ITRF00		
N0.	**POINT**	**LATITUDE**	**LONGITUDE**	**LATITUDE**	**LONGITUDE**	**SECTOR**
1	38042	30º 32' 22.931"	47º 09' 24.537"	30º 32' 23.6257"	47º 09' 14.01096"	1
2	38065	30º 16' 10.813"	47º 42' 43.323"	30º 16' 11.6012"	47º 42' 32.89408"	
3	38069	30º 14' 23.623"	47º 28' 37.963"	30º 14' 24.3968"	47º 28' 27.50669"	
4	38084	30º 04' 24.290"	47º 12' 13.476"	30º 04' 25.0719"	47º 12' 03.0044"	
5	42025	29º 19' 33.123"	46º 40' 04.566"	29º 19' 34.0006"	46º 39' 54.10258"	
6	32063	31º 21' 24.908"	44º 34' 11.587"	31º 21' 25.2519"	44º 34' 00.6453"	2
7	32071	31º 13' 09.5439	44º 50' 33.340"	31º 13' 09.9335"	44º 50' 22.4471"	
8	33050	31º 33' 59.5317	45º 06' 08.499"	31º 33' 59.8845"	45º 5' 57.5971"	
9	33087	31º 10' 45.2486	45º 27' 19.421"	31º 10' 45.6977"	45º 27' 8.6081"	
10	33070	31º 22' 39.1889	45º 17' 31.174"	31º 22' 39.5888"	45º 17' 20.3169"	
11	32024	31º 44' 29.8345	44º 18' 54.651"	31º 44' 30.0922"	44º 18' 43.6337"	3
12	32063	31º 21' 24.9081	44º 34' 11.587"	31º 21' 25.2519"	44º 34' 00.6453"	
13	32071	31º 13' 09.5439	44º 50' 33.340"	31º 13' 09.9335"	44º 50' 22.4471"	
14	26043	32º 34' 4.4941"	44º 00' 49.638"	32º 34 '14.5904"	44º 00' 38.4852"	4
15	25043	32º 32' 00.745"	43º 32' 50.738"	32º 32' 00.8067"	43º 32' 39.5366"	
16	26057	32º 27' 43.343"	43º 34' 25.794"	32º 27' 43.4205"	43º 34' 14.6038"	
17	26046	32º 33' 25.316"	43º 54' 25.514"	32º 33' 25.4082"	43º 54' 14.3517"	
18	26060	32º 22 35.059"	44º 34 34.693"	32º 22' 35.2362"	44º 34 23.6365"	5
19	26082	32º 11 43.069"	44º 43 05.885"	32º 11' 43.2858"	44º 42' 54.8675"	
20	26063	32º 23 30.297"	44º 20' 40.309"	32º 23' 30.4513"	44º 20' 29.2197"	
21	26034	32º 42 44.668"	44º 25' 38.129"	32º 42' 44.7787"	44º 25' 27.0129"	
22	26085	32 08 47.700"	44º 19 '30.222"	32º 08' 47.8937"	44º 19' 19.1586"	
23	27115	32º 7' 36.436"	45º 13' 50.101"	32º 07' 36.7065"	45º 13' 39.1536"	6
24	27117	32º 07' 03.069"	45º 00' 36.859"	32º 07' 03.3229"	45º 00' 25.8848"	
25	26095	32º 05' 34.791"	44º 47' 10.918"	32º 5' 35.0288"	44º 46' 59.9169"	
26	32014	31º 51' 17.661"	44º 54' 51.943"	31º 51' 17.9493"	44º 54' 40.9887"	
27	33014	31º 53' 38.533"	45º 33' 31.306"	31º 53' 38.8681"	45º 33' 20.4248"	
28	27107	32º 11' 02.153"	45º 57' 02.361"	32º 11' 02.4766"	45º 56' 51.4950"	7
29	27106	32º 11' 23.163"	46º 18' 06.222"	32º 11' 23.5145"	46º 17' 55.4021"	
30	27073	32º 28' 32.188"	46º 07' 20.380"	32º 28' 32.4791"	46º 07' 09.5027"	
31	27093	32º 14' 40.936"	46º 01' 39.454"	32º 14' 41.2573"	46º 01' 28.5926"	
32	27122	32º 01' 47.036"	46º 05' 26.896"	32º 01' 47.3971"	46º 05' 16.0668"	
33	33004	31º 56' 03.608"	46º 11' 20.545"	31º 56' 03.9930"	46º 11' 09.7403"	8
34	33008	31º 55' 51.008"	46º 00' 52.240"	31º 55' 51.3813"	46º 00' 41.4137"	
35	33021	31º 49' 43.443"	45º 50' 27.655"	31º 49' 43.815"	45º 50' 16.8188"	
36	33066	31º 26' 20.987"	46º 26' 52.393"	31º 26' 21.4725"	46º 26' 41.67583"	
37	33074	31º 19' 46.018"	46º 04' 55.284"	31º 19' 46.4932"	46º 04' 44.53461"	
38	28030	32º 16' 15.265"	47º 21' 32.208"	32º 16' 15.689"	47º 21' 21.5129"	9
39	28042	32º 07' 58.020"	47º 08' 27.391"	32º 07' 58.448"	47º 08' 16.6843"	
40	28045	32º 06' 34.922"	47º 26' 31.677"	32º 06' 35.381"	47º 26' 21.0135"	
41	34002	31º 57' 23.367"	47º 37' 02.531"	31º 57' 23.866"	47º 36' 51.9082"	
42	34009	31º 55' 52.377"	47º 00' 03.624"	31º 55' 52.827"	46º 59' 52.9237"	
43	34095	31º 04' 11.279"	47º 25' 23.510"	31º 04' 11.9057"	47º 25' 12.95900"	10
44	38013	30º 46' 56.612"	47º 33' 58.377"	30º 46' 57.2996"	47º 33' 47.87621"	
45	38038	30º 35' 31.406"	46º 52' 46.905"	30º 35' 32.0697"	46º 52' 36.33556"	
46	38069	30º 14' 23.623"	47º 28' 37.963"	30º 14' 24.3968"	47º 28' 27.50669"	

47	38084	30º 04' 24.290"	47º 12' 13.476"	30º 04' 25.0719"	47º 12' 03.00446"	

First step, the conversion from the latitude and longitude coordinates into the cartesian (geocentric) coordinates is rather straight forward and turns ellipsoidal,with respect (h=0), as shown in (Table -1) [3].

Table-2: The Cartesian coordinates ofall points for two systems

		(Clarke1880) Cartesian coordinates			(WGS84/ITRF00)Cartesian coordinates		
No.	**point**	**X**	**Y**	**Z**	**X**	**Y**	**Z**
1	38042	3738792.92	4031429.87	3221794.38	3738872.76	4031103.30	3222064.68
2	38065	3709745.53	4078677.74	3195977.05	3709826.75	4078352.77	3196248.58
3	38069	3727554.46	4064665.06	3193126.00	3727635.16	4064339.45	3193397.03
4	38084	3753210.81	4053630.20	3177169.35	3753290.90	4053303.90	3177439.81
5	42025	3819125.502	4048216.073	3105195.44	3819204.552	4047888.457	3105464.878
6	32063	3883750.171	3825873.574	3299494.392	3883823.413	3825539.787	3299759.115
7	32071	3871114.066	3849902.499	3286457.37	3871188.052	3849569.446	3286722.685
8	33050	3839465.517	3853208.753	3319318.496	3839540.123	3852876.322	3319584.379
9	33087	3831332.018	3892725.163	3282656.276	3831407.543	3892393.743	3282922.98
10	33070	3834387.24	3873669.641	3301447.701	3834462.366	3873337.746	3301713.991
11	32024	3884751.054	3792979.746	3335843.07	3884823.561	3792645.264	3336107.224
12	32063	3883750.171	3825873.574	3299494.392	3883823.406	3825539.78	3299759.131
13	32071	3871114.066	3849902.499	3286457.37	3871188.052	3849569.446	3286722.685
14	26043	3869461.701	3738495.725	3413671.42	3869533.336	3738160.431	3413934.89
15	25043	3901369.536	3708403.876	3410198.743	3901439.891	3708067.46	3410461.163
16	26046	3877004.557	3731848.64	3412394.73	3877075.855	3731513.076	3412658.027
17	26048	3851459.291	3760412.723	3409980.457	3851531.675	3760078.223	3410244.612
18	26060	3840811.923	3784423.071	3395495.588	3840884.952	3784089.278	3395760.342
19	26082	3839043.382	3801477.95	3378517.96	3839116.827	3801144.548	3378782.981
20	26063	3855437.522	3768218.306	3396932.432	3855510.009	3767883.873	3397196.655
21	26034	3836329.245	3760388.186	3426904.614	3836401.885	3760053.982	3427169.028
22	26085	3867101.063	3777049.578	3373945.708	3867173.518	3776715.087	3374209.92
23	27115	3807749.132	3838521.261	3372087.004	3807823.899	3838189.196	3372353.143
24	27117	3822869.253	3824235.779	3371216.587	3822943.48	3823903.106	3371482.261
25	32014	3840182.008	3828728.451	3346518.642	3840256.015	3828395.589	3346784.081
26	33014	3795283.445	3870030.94	3350203.201	3795359.112	3869699.737	3350470.044
27	26095	3838808.169	3810287.506	3368913.356	3838881.88	3809954.23	3369178.503
28	27107	3756863.895	3883647.447	3377451.383	3756940.445	3883317.204	3377719.163
29	27106	3732758.799	3906344.881	3377999.073	3732836.176	3906015.606	3378267.597
30	27073	3733221.847	3882418.503	3404780.927	3733298.76	3882088.702	3405049.063
31	27093	3749149.013	3886105.502	3383152.868	3749225.707	3885775.475	3383420.83
32	27122	3753655.496	3899372.423	3362968.258	3753732.39	3899042.585	3363236.356
33	33004	3750842.878	3909845.405	3353996.098	3750920.004	3909515.865	3354264.41
34	33008	3762877.815	3898549.514	3353666.737	3762954.501	3898219.469	3353934.735
35	33066	3753011.5	3947651.735	3307277.651	3753089.428	3947322.962	3307546.462
36	33074	3782536.598	3928169.586	3296893.29	3782613.621	3927839.851	3297161.352
37	33021	3778830.959	3891426.795	3344053.452	3778907.26	3891096.352	3344320.993
38	28030	3656797.339	3971022.844	3385609.914	3656877.22	3970696.389	3385880.671
39	28042	3677431.87	3963063.276	3372649.994	3677511.273	3962736.282	3372920.261
40	34002	3651342.62	4001165.736	3356080.634	3651423.07	4000840.051	3356352.029
41	34009	3695184.544	3962739.872	3353702.519	3695263.623	3962412.536	3353972.532
42	28045	3657468.69	3983342.294	3370482.273	3657548.737	3983016.105	3370753.258
43	34095	3699647.77	4026607.459	3272270.093	3699728.079	4026281.469	3272540.979
44	38013	3700634.279	4047915.678	3244937.233	3700714.988	4047590.165	3245208.443
45	38069	3727554.458	4064665.064	3193126.004	3727635.17	4064339.458	3193397.01
46	38084	3753210.811	4053630.205	3177169.35	3753290.897	4053303.898	3177439.81
47	38038	3756230.402	4011145.221	3226791.698	3756309.589	4010817.84	3227061.434

The three-dimensional conformal coordinate transformation (helmert7-parameters) is also known as the seven-parameter similarity transformation. It is one of the most commonly used transformation methods in geodetic system and surveying, which preserves shape, so angles are not changed The three-dimensional conformal coordinate transformation involves seven parameters (three rotations,three translations, and one scale factor), 3D translation is the shift in origin of one coordinate system to the other, as shown in (Table-3) [4, 5].

Table-3: Results of Seven- Parameters Translation of ten sectors

No.	dS	X-Rotate $d\omega$	Y-Rotate $d\varphi$	Z-Rotate dk	dTx	dTy	dTz	Sector
1	0.9999991748	-0º 00' 03.7"	-0º 00' 02.8"	0º 00' 07.8"	119.557 m	130.746 m	-246.265 m	1
2	0.9999995069	-0º 00' 03.7"	-0º 00' 03.2"	0º 00' 07.9"	126.286 m	127.887 m	-254.792 m	2
3	0.9999993306	-0º 00' 03.5"	-0º 00' 03.0"	0º 00' 08.1"	127.439 m	127.471 m	-253.487 m	3
4	1.0000004733	-0º 00' 03.6"	-0º 00' 03.5"	0º 00' 08.0"	128.633m	124.84m	-265.643m	4
5	0.9999984885	-0º 00'03.6"	-0º00' 03.3"	0º 00'08.0"	134.048 m	131.685 m	-255.672 m	5
6	0.9999995043	-0º 00' 03.5"	-0º 00' 03.2"	0º 00' 08.0"	127.245m	128.95m	-257.08 m	6
7	0.9999993378	-0º 00'03.4"	-0º00' 03.2"	0º 00' 07.7"	123.490 m	136.423 m	-259.490 m	7
8	0.9999979027	-0º 00' 03.5"	-0º 00' 03.0"	0º 00' 07.9"	129.921m	136.879	-249.887m	8
9	0.9999989609	-0 º00' 03.7"	-0º 00' 03.4"	0º 00' 07.6"	124.639 m	135.967 m	-255.785 m	9
10	0.9999982269	-0º 00' 03.6"	-0º 00' 02.8"	0º 00' 07.8"	122.779 m	137.473 m	-246.532 m	10

When comparing the Cartesian coordinates for all points with the Cartesian coordinates for the same points after the transformation depending on translation parameters, as shown in (Table-4) [6].

Table-4: Cartesian coordinates for all control points with the Cartesian coordinates for the same points after the transformation depending on translation parameters

No.	point	X	Y	Z	X	Y	Z	ΔX	ΔY	ΔZ
1	38042	3738792.92	4031429.87	3221794.38	3738792.92	4031429.88	3221794.38	0.00	-.01	0.00
2	38065	3709745.53	4078677.74	3195977.05	3709745.51	4078677.74	3195977.06	0.02	0.00	-.01
3	38069	3727554.46	4064665.06	3193126.00	3727554.47	4064665.06	3193126.00	-.01	0.01	0.00
4	38084	3753210.81	4053630.20	3177169.35	3753210.82	4053630.19	3177169.35	-.01	0.01	0.00
5	42025	3819125.50	4048216.07	3105195.44	3819125.58	4048215.95	3105195.48	-.08	0.12	-.04
7	32063	3883750.17	3825873.57	3299494.39	3883750.15	3825873.56	3299494.40	0.02	0.01	-.01
8	32071	3871114.06	3849902.49	3286457.37	3871114.07	3849902.49	3286457.36	-.01	0.00	0.01
9	33050	3839465.52	3853208.75	3319318.49	3839465.53	3853208.74	3319318.49	-.02	0.01	0.01
10	33087	3831332.02	3892725.16	3282656.27	3831332.01	3892725.18	3282656.28	0.01	-.02	-.01
11	32024	3884751.05	3792979.74	3335843.07	3884751.06	3792979.74	3335843.05	-.01	0.00	0.02
12	32063	3883750.17	3825873.57	3299494.39	3883750.16	3825873.57	3299494.40	0.01	0.00	-.01
13	32071	3871114.06	3849902.49	3286457.37	3871114.06	3849902.50	3286457.37	0.01	-.01	0.00
14	26043	3869461.70	3738495.73	3413671.42	3869461.74	3738495.71	3413671.40	-.04	0.02	0.02
15	25043	3901369.54	3708403.87	3410198.74	3901369.53	3708403.89	3410198.73	0.00	-.02	0.02
16	26046	3877004.55	3731848.64	3412394.73	3877004.54	3731848.62	3412394.78	0.02	0.02	-.05
17	26048	3851459.29	3760412.72	3409980.45	3851459.28	3760412.74	3409980.44	0.01	-.02	0.01
18	26060	3840811.92	3784423.07	3395495.58	3840811.89	3784423.08	3395495.61	0.03	-.01	-.02
19	26082	3839043.38	3801477.95	3378517.96	3839043.38	3801477.96	3378517.95	-.01	-.01	0.01
20	26063	3855437.52	3768218.31	3396932.43	3855437.53	3768218.28	3396932.44	-.01	0.02	-.01
21	26034	3836329.24	3760388.18	3426904.61	3836329.25	3760388.19	3426904.59	-.01	-.01	0.02
22	26085	3867101.06	3777049.57	3373945.71	3867101.05	3777049.54	3373945.77	0.01	0.04	-.07
23	27115	3807749.13	3838521.26	3372087.01	3807749.12	3838521.26	3372087.01	0.01	-.01	-.01
24	27117	3822869.25	3824235.78	3371216.59	3822869.26	3824235.75	3371216.61	-.01	0.03	-.02
25	32014	3840182.01	3828728.45	3346518.64	3840181.99	3828728.47	3346518.63	0.01	-.03	0.01
26	33014	3795283.45	3870030.94	3350203.20	3795283.46	3870030.93	3350203.18	-.02	0.01	0.01
27	26095	3838808.17	3810287.51	3368913.36	3838808.23	3810287.46	3368913.34	-.06	0.05	0.02
28	27107	3756863.89	3883647.45	3377451.38	3756863.91	3883647.42	3377451.38	-.01	0.02	0.00
29	27106	3732758.79	3906344.88	3377999.07	3732758.79	3906344.92	3377999.07	0.00	-.04	0.01
30	27073	3733221.85	3882418.50	3404780.93	3733221.86	3882418.49	3404780.92	-.01	0.01	0.01
31	27093	3749149.01	3886105.50	3383152.87	3749148.99	3886105.49	3383152.88	0.02	0.00	-.02
32	27122	3753655.49	3899372.42	3362968.26	3753655.49	3899372.44	3362968.27	0.01	-.01	-.02
33	33004	3750842.88	3909845.41	3353996.09	3750842.89	3909845.42	3353996.08	-.01	0.00	0.02
34	33008	3762877.82	3898549.51	3353666.74	3762877.80	3898549.49	3353666.77	0.01	0.02	-.04
35	33066	3753011.5	3947651.74	3307277.65	3753011.53	3947651.72	3307277.63	-.03	0.01	0.02
36	33074	3782536.59	3928169.58	3296893.29	3782536.56	3928169.62	3296893.29	0.04	-.03	0.00
37	33021	3778830.96	3891426.79	3344053.45	3778830.94	3891426.84	3344053.4	0.02	-.05	0.05
38	28030	3656797.34	3971022.84	3385609.91	3656797.35	3971022.85	3385609.88	-.02	-.01	0.03
39	28042	3677431.87	3963063.27	3372649.99	3677431.89	3963063.28	3372649.97	-.02	0.00	0.02
40	34002	3651342.62	4001165.74	3356080.63	3651342.58	4001165.75	3356080.65	0.03	-.02	-.01
41	34009	3695184.54	3962739.87	3353702.52	3695184.54	3962739.84	3353702.55	0.00	0.03	-.04
42	28045	3657468.69	3983342.29	3370482.27	3657468.67	3983342.31	3370482.28	0.02	-.02	-.01
43	34095	3699647.77	4026607.47	3272270.09	3699647.78	4026607.46	3272270.09	-.01	0.00	0.01
44	38013	3700634.28	4047915.68	3244937.23	3700634.26	4047915.68	3244937.25	0.02	0.00	-.01
45	38069	3727554.46	4064665.06	3193126.00	3727554.48	4064665.06	3193125.98	-.02	0.00	0.02
46	38084	3753210.81	4053630.21	3177169.35	3753210.79	4053630.21	3177169.36	0.01	0.00	-.01
47	38038	3756230.40	4011145.22	3226791.69	3756230.39	4011145.19	3226791.67	0.01	0.02	0.03

To determine the Standard Error of the mean for all points [7], as shown in Table-5:

Table-5: The Standard Error of the mean for all points

No.	point	ΔX	ΔY	ΔZ	Vx2	Vy2	Vz2
1	38042	-79.835	326.563	-270.308	12.723	14.977	8.3059
2	38065	-81.229	324.969	-271.536	24.612	29.855	16.8921
3	38069	-80.704	325.615	-271.026	19.678	23.213	12.9600
4	38084	-80.086	326.304	-270.462	14.577	17.049	9.2173
5	42025	-79.050	327.616	-269.438	7.740	7.935	4.0481
6	32063	-73.241	333.787	-264.723	9.160	11.250	7.3077
7	32071	-73.986	333.052	-265.315	5.209	6.860	4.4543
8	33050	-74.606	332.430	-265.883	2.764	3.990	2.3810
9	33087	-75.525	331.420	-266.704	0.552	0.974	0.5213
10	33070	-75.126	331.895	-266.289	1.304	2.138	1.2919
11	32024	-72.507	334.482	-264.153	14.146	16.391	10.7095
12	32063	-73.234	333.794	-264.739	9.203	11.296	7.2199
13	32071	-73.986	333.052	-265.315	5.209	6.860	4.4543
14	26043	-71.636	335.295	-263.470	21.459	23.635	15.6469
15	25043	-70.355	336.417	-262.420	34.963	35.808	25.0618
16	26046	-71.298	335.564	-263.297	24.705	26.327	17.0507
17	26048	-72.384	334.500	-264.155	15.082	16.539	10.6972
18	26060	-73.030	333.793	-264.754	10.486	11.288	7.1372
19	26082	-73.445	333.402	-265.021	7.971	8.812	5.7855
20	26063	-72.487	334.433	-264.223	14.292	16.000	10.2591
21	26085	-72.455	334.491	-264.212	14.542	16.471	10.3308
22	27115	-74.767	332.065	-266.139	2.253	2.662	1.6568
23	27117	-74.227	332.672	-265.674	4.165	5.015	3.0683
24	32014	-74.007	332.862	-265.440	5.111	5.901	3.9451
25	33014	-75.667	331.203	-266.843	0.361	0.593	0.3405
26	26095	-73.711	333.276	-265.147	6.536	8.082	5.1916
27	27107	-76.550	330.243	-267.780	0.080	0.036	0.1255
28	27106	-77.377	329.275	-268.524	1.230	1.342	1.2063
29	27073	-76.913	329.801	-268.136	0.416	0.399	0.5045
30	27117	-74.227	332.672	-265.674	4.165	5.015	3.0683
31	27093	-76.694	330.027	-267.962	0.181	0.165	0.2876
32	27122	-76.894	329.838	-268.098	0.392	0.354	0.4510
33	33004	-77.127	329.540	-268.311	0.737	0.797	0.7841
34	33008	-76.686	330.045	-267.999	0.175	0.150	0.3278
35	33066	-77.928	328.773	-268.811	2.754	2.756	1.9186
36	33074	-77.023	329.735	-268.062	0.570	0.487	0.4045
37	33021	-76.302	330.443	-267.541	0.001	0.000	0.0132
38	28030	-79.880	326.455	-270.757	13.050	15.828	11.0962
39	28042	-79.402	326.994	-270.267	9.823	11.829	8.0728
40	34002	-80.450	325.685	-271.395	17.486	22.544	15.7565
41	34009	-79.079	327.336	-270.013	7.902	9.591	6.6926
42	28045	-80.047	326.189	-270.985	14.283	18.009	12.6631
43	34095	-80.309	325.990	-270.886	16.328	19.743	11.9698
44	38013	-80.708	325.512	-271.210	19.714	24.212	14.3180
45	38069	-80.711	325.606	-271.006	19.744	23.298	12.8183
46	38084	-80.087	326.307	-270.460	14.582	17.025	9.2052
47	38038	-79.187	327.381	-269.736	8.521	9.314	5.3356
Standard error of the mean of the all points					0.0085	0.0122	0.0086

To determine the Standard deviation for transformation points in ten sectors in (X,Y,Z) [7], as shown in Table-6.

Table-6: The Standard deviation for transformation points in ten sectors

		Original coordinates			Computed coordinates			Standard deviation		
sector	**point**	**X**	**Y**	**Z**	**X**	**Y**	**Z**	**S x**	**S y**	**S z**
1	42025	3819125.50	4048216.07	3105195.44	3819125.58	4048215.95	3105195.48	0.0003	0.0008	0.0000
2	33070	3834387.24	3873669.64	3301447.70	3834387.27	3873669.64	3301447.67	0.0000	0.0001	0.0000
3	35018	4008692.51	3760175.05	3225255.55	4008692.44	3760174.97	3225255.65	0.0001	0.0002	0.0004
4	26057	3902746.33	3713137.66	3403511.56	3902746.32	3713137.66	3403511.58	0.0000	0.0002	0.0000
5	26085	3867101.06	3777049.58	3373945.71	3867101.06	3777049.54	3373945.78	0.0001	0.0000	0.0001
6	26095	3838808.17	3810287.51	3368913.36	3838808.23	3810287.46	3368913.34	0.0001	0.0000	0.0000
7	27122	3753655.50	3899372.42	3362968.26	3753655.49	3899372.44	3362968.28	0.0001	0.0001	0.0001
8	33021	3778830.96	3891426.80	3344053.45	3778830.94	3891426.84	3344053.40	0.0000	0.0000	0.0000
9	28045	3657468.69	3983342.29	3370482.27	3657468.67	3983342.31	3370482.28	0.0000	0.0001	0.0001
10	38038	3756230.40	4011145.22	3226791.70	3756230.40	4011145.20	3226791.67	0.0001	0.0000	0.0000

According the results could be depending the mean translation 7- parameters(Tx,Ty,Tz,Rx,Ry,Rz,S) in selected area in Iraq for transformation the geodetic coordinates from local reference (Clarke1880) to the global reference (ITRF00),as shown in Table-7.

Table-7: The results of the mean of 7- parameters and the standard error of the mean

Item	Tx	Ty	Yz	Rx	Ry	Rz	S
Mean of parameter	-76.268	330.433	-267.42	-º00'3.58"	-0º 00' 3.14"	0º00'07.88"	0.999999091
Standard error of mean	0.45m	0.49m	0.39m	0º0'0.0326"	0º0'0.0748"	0º0'0.048"	0.0000002337

OUTPUT

According to the development,surveying and geodetic technics and geospatials software, it has been required to join the local coordinate system of Iraq with global same systems.So,it could be easy to use a have mentional technic with huge as chive Iraqi surveying geodetic data such as maps, control points, aerial photographs and data for project managements.

By using the method of (Helmert 7-parameters) was reached:

- The local Datum center was defined (Geocentric) as a surface Datum.
- The seven- parameter coefficients between the local and global system were calculated for all sectors and accurately in mean, standard error in Cartesian coordinates(0.45,0.49,0.39,0º0'0.0326",0º0'0.0748", 0º0'0.048",0.0000002337) respectively.
- The standard deviation of the transformation points (Cartesian coordinates) in ten sectors range between (0.0000-0.0003,0.0000-0.0008,0.0000-0.0004) respectively.
- Determined at of local(Clarke1880) ellipsoid geodetic with respect to ITRF00.

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