

SOME PROBLEM IN LARGE SCAL MAPPING

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Abstract: This paper concerned in computer aid drawing in working station. Firstly, study precision in large mapping using photogrammetry method; Secondly, collection data from field work and from photogrammetry, the data communication between different type of computers and between computers and handle computers. How to improve hardware and software system in the processing data. And compare cadastral survey in Estern part and Arica.

1 PRECISION OF SCALE MAPPING USING PHOTOGRAMMETRY METHOD

There is a test in one map, map scale 1:1000, photo scale about 1:4000, about 50 checking points, they were done using the theodolite T2 plus distance meter DI3000. Traverse accurate is 8". Meantime measured checking points in analog plotter B8S and analytical plotter BC1. Its plality precision as table 1 (for B8S) and table 2 (for BC1). Compare the differences of coordinates between photogrammetry points and field checking points. Get mean square error 0.481 (for B8S) and 0.506 (for BC1).

So we can say from test map, it can be got good result using photogrammetry method in scale 1:1000 in analytical plotter and analog plotter.

table 1

point no.	error (mm)	error die.	point no.	error (mm)	error die.
40	0.35	↗	5	0.50	↘
39	0		4	0.30	↘
38	0.30	↗	7	0.40	↘
37	0		9	0.60	↘
35	0.40	↗	13	1.20	↗
33	0.30	↗	16	0.10	↗
34	0		14	0.10	↗
42	0.40	↘	19	0	
41	0.30	↘	114	0.40	↗
31	0.25	↗	25	0.30	↗
30	0.60	↗	24	0.60	↗
28	0.30	↗	21	0	
43	0.75	↗	22	0.40	↗
44	0.60	↗	112	0.25	↘
45	0.20	↗	105	0.25	↘
47	0.30	↗	106	0.60	↘
1	0.55	↗	61	0.65	↗
2	0.30	↗	67	0.60	↗
3	0.45	↘	71	0.60	↗
48	0.80	↘	70	0.30	↗
60	0.60	↘	69	0.25	↗
51	0.70	↘	72	0.50	↘
57	0.75	↘			

table 2

point no.	error (mm)	error die.	point no.	error (mm)	error die.
1	0.55	↗	25	0.50	↗
2	0.50	↗	27	2.00	↗
4	0.35	↗	28	0.45	↗
5	0.40	↗	30	0.55	↗
7	0.50	↗	31	0.55	↗
8	0.15	↘	33	0.35	↘
9	0.40	↗	34	0.55	↗
14	0.70	↗	35	1.00	↗
17	0.35	↗	37	0.50	↗
19	0.35	↗	38	0.10	↗
20	0.45	↗	39	0.30	↗
22	0.50	↘	40	0.40	↗
24	0.40	↗	41	0.25	↗

table 2

point no.	error (mm)	error die.	point no.	error (mm)	error die.
42	0.75	↗	44	0.05	↗
43	0.45	↗	47	0.35	↗
48	0		51	0.35	↗
53	0.35	↗	54	0.40	↗
55	1.25	↗	57	0.50	↗
58	0.10	↗	59	0.20	↗
60	0.25	↗	61	0.55	↗
63	0.40	↗	67	0.50	↗
69	0.30	↗	70	0.50	↗
71	0.40	↗	72	0.35	↗
74	0.45	↗	75	0.55	↗
77	0.10	↗	79	0.45	↗
80	0.15	↗	81	0.35	↗
82	0.25	↗	83	0.20	↗
84	0.50	↗	85	0.40	↗
86	0.25	↗	87	0.30	↗
89	0.05	↗	90	0.40	↗
105	0.35	↗	106	0.35	↗
107	0.45	↘	109	0.45	↘
112	0.50	↗	114	0.15	↗

2 COMMUNICATION

From section 1 we have known photogrammetry method can be used for producing large scale map. So in large area, photogrammetry method will be used and in small area field work still should be used. So data acquisition can be from different methods and different equipments. From analytical plotter if using photogrammetry methods and data automatical recording, from analog plotter it must be connect with recording equipment, from total station with electric field book, from handle computer it must be transfer to your computer if you use theodolite plus distance metre, from another computer you must transfer data between different computers. It can be from digitizer and scanner, also modem, data will directly to your computer and the another computer far away from you. At last it can be manual.

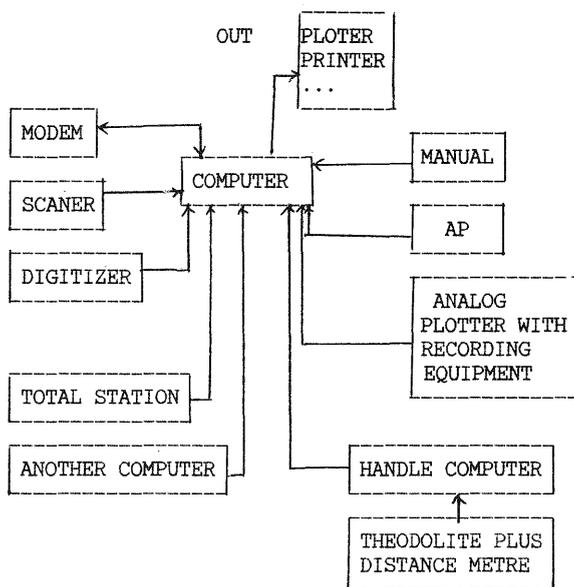


FIGURE 1

IF using analytical plotter for drawing the data will be automatical collected. If using Analog plotter recording equipment is needed. For field work the equipments can be use as follow:

- a theodolite and tape
- b theodolite plus distance meter
- c total station (integrate or seperate) must be with electric field book.

For a and b,data recording can be manual or using portable calculator or handel computer.

**i communication between portable calculator and computer**

For example portable calculator is PC 1500 and computer is IBM-PC/XT.If collection data PC1500 in the field. Now we have to transfer data from PC1500 to IBM PC/XT. There are a standard interface RS 232.The connection scatch is as figure 2.

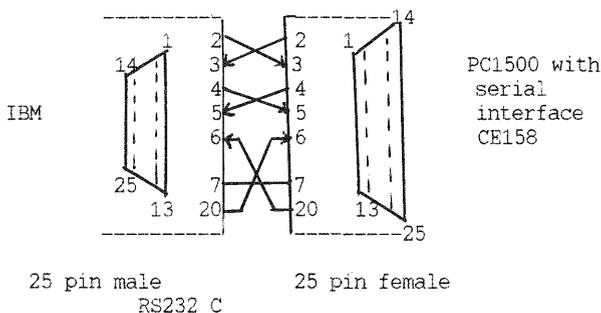


figure 2

In figure 2 PC1500 must be connect serial interface CE158. computer will connect to CE158 by RS 232c,they are 25 pins.  
where:

- pin 2 TD - transfer data
- pin 3 RD - receive data
- pin 4 S - signal
- pin 5 CTS- control transfer signal  
on. transfer signal  
off. stop transfer
- pin 6 DSR-data signal ready
- pin 7 SG -signal ground
- pin 8 CD
- pin 20 DTR-data terminal ready  
on. ready  
off. no ready

For sorftware in IBM computer need put trasfer program  
10 OPEN "COM1:1200,N,8,1"AS#1  
20 INPUT "FILE NAME:";F1\$

When switch on IBM PC and PC1500, before transferring, SETCOM,1200,8,N,1 in PC1500 and then run transfer program.

**ii communication between data terminal and computer a hardware interface**

If total station is TC1000 and data terminal is GRE4. The hardware interface between computer and GRE4 is RS 232 (GIF 2).Connect scatch as figure 3.

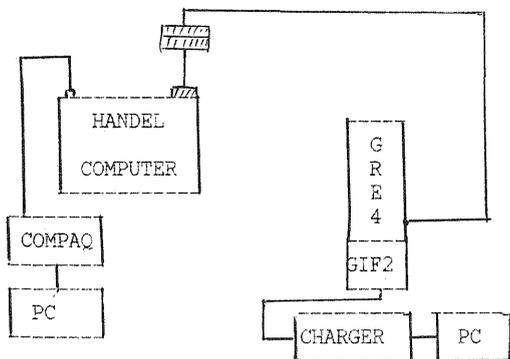


figure 3

**b software interface**

Using TRANSE program we can transfer program from computer to GRE, data from GRE to computer,also data from computer to GRE (from file).

Transferring program from computer to GRE, must set parameters on GRE.

- Set MODE 70 RUN 2400 RUN RUN
- Set MODE 71 RUN 2 RUN RUN
- Set MODE 72 RUN 1 RUN RUN
- Set MODE 73 RUN 0 RUN RUN
- Set MODE 74 RUN 2 RUN RUN

When data from GRE to computer, data can be on screen, on printer, or on diskette.When data from computer to GRE (from file), you must set parameters on GRE. It's same with trasfering program.

**c problem**

When you want to put data in disc file from data terminal. At first you must to know what kind of data format, and then open the file, read the file.After reading the file it must direct go to the survey program. If you don't know data format in survey program, you can't make software interface.For any program when it was finished, ones can't take care everything. for example, in SURVEYPLOT program there is a field-book (interface), it is for KERN R48 not for GRE. It can not for all intruments. New instruments are coming soon. It is developing. So it is always not completed. We have to develop it. Sometime it's a small thing but important.Now we have finished a sorftware interface from GRE4 to computer, connect to our program traverse program or traverse net program.

**3 DEVELOPING PROGRAM IN DATA TERMINAL**

**i differences in survey in different areas**

For field survey procedure. There are some differences between differnt countries. For example in traverse survey in BOTSWANA. Survey direction in each station and in some countries survey the angers between two directions. For the first you can measure any known points in every station. For the secondly it can't, you can't use these known condition for ajustment, because of limited program. There are many specifications of survey in some countries,the others not. such as survey in BOTSWANA ,quite few limited conditions in survey. It's very facility for surveyor.But when you find out problems at last, you must repeat survey from beginning. If using checking conditions for observations in the procedures with data terminal. We must make some programs for data terminal.Such as traverse ,leverling ... different specifications for different survey.

For traverse, must check:

- a limited differents of 2C in each direction
- b two times readings
- c direction differents in a few rounds
- d two times observations of distance
- e torerences of 2C (horizontal collimation error) and i(vertical index error)

When we use observation programs, if torerences is overceeded,the program will show you the valus and instruction ask you repeate or continue or stop. The procedure calculation is automatic finished. surveyor only follow program what he must do.

Observation programs are very important for surveying. If each procedure is OK! we never repeat survey. Otherwise sometimes we have to repeate, because the accurate is not good at last.

Now it is going to computer world. When you get a hardware you should do something for completed system. Everything is developing.

**ii cadastral survey in BOTSWANA**

BOTSWANA is adeveloping country. There is a DEPARTMENT OF SURVEY AND LANDS and 12 land boards.Before last year there are not any surveyor in the land boards. Cadastral survey only for DEPARTMENT OF SURVEY AND LANDS and some private survey companies. There are technicians in the land board.

They use only tape to get plot scatch. No coordinates and directions, so no diagram for plot. From this year, there are two land surveyor in each land board. And they have got a complete automatic plotting system. In each land board there are two total station TC1000 with GRE4 for collection data. There a computer 486 with 120 M hard disc, and 4 M memory. One handel computer 286 for data transfer and computation in the field. one plotter, one printer, one digitizer and one modem. There are software microstation, surveyplot, wordperfect, dbase4, lotus 123. collection data from field to computer and to the ploter. Set up cadastral data bank. The working station as figure 4.

Problem is data fro GRE4 to surveyplot or make new traverse program and observation programs.

From getting equipments to produce map only two months in BOTSWANA. It's fast for a developing country in AFRICA. We should take a look.

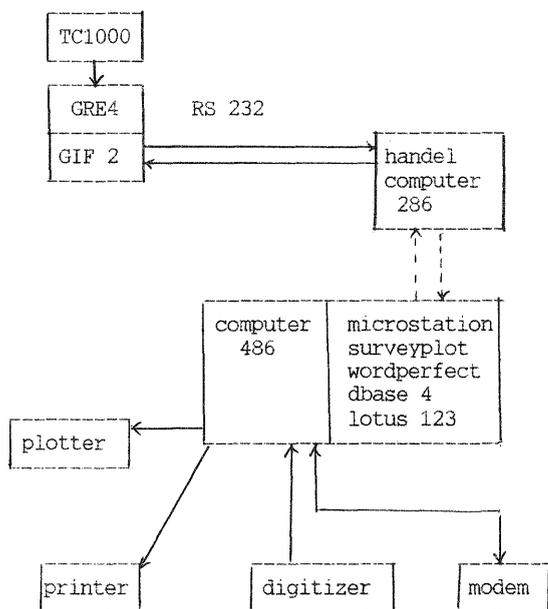


figure 4