Explore New Sorts of Mapping

Face A Bigger Market

------The Development of "Shenzhen

Scenographical Map Album"

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Abstract: Urban mapping develops very fast and many great works of mapping spring up. It's a new attempt to work out the urban map atlas on the basis of aviation photos. This article records the development procedure of the atlas and emphatcially discusses some problems such as the join and split of aerophotos and meanwhile introduce how to tackle some specific technical problems in the design of this atlas.

Keywords: aviation photos   city atlas   CAC

Preface

With the rapid development of city mapping, excellent atlases have been emerging. However, it's a new try to edit a city atlas based on aviation photos. Its design should not be the same as traditional atlases, it has more daring innovations , combining up-to-date CAC with traditional designing technology. This is not only to get rid of the stale and bring forth the fresh but also to be a research process obviously.

We have responded for the editing of《Photo Atlas of Shenzhen City》for the 20 th anniversery of Shenzhen city ,supported by Shenzhen Land bureau .The aim is to reflect the great changes and the achievements of Shenzhen city , so that the world can better understand the Shenzhen city. This atlas is the first practical City Atlas based on aviation photos in China . This atlas was compiled by means of digital operation entirely. The graphical software------Coreldraw has been combined organically with photo-dealing-software Photoshop in practice. Every photo has its map border, mathematic base, map decoration etc., while using live atlas language to describe objects .In the new-type atlas, the characters and distribution rules of water system, road and landscape etc. have been recorded strictly according to the reality. Compared with line-drawing atlas, the aviation photos have much more practical values as geography map. What's more, it can give people the feeling of bein becg the real placeause it is live and vivid. Therefore it can be said that it is not only a book of atlas works having deep meanings, but also a work of art being graceful and comfort.

I. The contents and purposes

《Photo Atlas of   Shenzhen City》reflects the environment and social economy of Shenzhen and the recent achievements of city-building in Shenzhen with vivid and direct atlas language scientifically. The contents includes:(1) providing the whole city streets distribution, traffic network and districts appearance of Shenzhen. (2)emphasizing roads and other atlas factors on the base of the latest aviation photos produced

in 1998 ,and showing the title of road, office, enterprise and terrain names. The targets of compling the atlas are: (1) helping the relative departments and personnel to understand the city landscope of Shenzhen and carry out macroeconomic research as relativly complete materials that fully reflects the development and the traffic network of the city from the beginning of building Shenzhen by cartographic means. (2) providing scientific reference materials for external communications and tour business ,official and business activities for Shenzhen City, and using as the traffic handbook for drivers and citizens. (3)studying the meanings of atlas and work goals , and research the principles of designing photo atlas for the designing characters of our family's photo atlas .

II.The means and process

It's a innovation to compile the practical city atlas in the form of photograph. The technology of computer image manipulation is used. The images are scanned, beset and correct. The cartographic symbols are drawn. Pretreating of typing is completed using colorful desk public system. The editing process of atlas is operated entirely in digital. The main tasks of editing atlas are :

1.beset and correct the aviation atlas to obtain ichnography of the whole photo

2.patch up and divide the images with the ratio of 1:10 000

There four designing -scales of mapsheet size in 《City Photo Atlas of Shenzhen》:1:8 000 ,1:12 000 ,1:24 000 and 1:18 000. However the scales in the basic materials of this atlas is 1:10 000.Therefore patching up and division of the element photo materials are very important in the designing and editing of the atlas.

The ideal method of patching-up and division is: first patch up all images with the scale of 1:10 000, cover the new size division net on it. In this method, it needs only to intercept the images of divisions while editing, and the precision can be guaranteed in the new no-slot patching images. However, limited by the hardware, we can not patch up all images because the data amount is too large and the memory is not enough. Considering practicality of hardware and the precision of the newly divided atlas, in the real operation, we implement this according to the following:

(1) erect the grid of map size at scale 1:10 000 on the printing---map of 1:45 000, decide the scale of divisions apiece by designing the size division and erect the size-division grid.

(2) decide the location of size-division lines on each image of scale 1:10 000 according to the size division net that has been erected.

(3) erect standard grid of 1:10 000 map according to the coordinate of the point on map border result form of fundamental file 1:10 000 images.

(4) dwindle each 1:10 000 image at the same scale in the condition of PhotoShop in order to reduce the data amount of each image and to improve the ability of data memory and dealing, patch up the 1:10 000 image that have been dwindled and examine the patching-up precision by standard 1:10000 grid to eliminate the error in the rang of each map in the best of abilities.

(5) erect standard size-division grid on the whole image that have been patched up and print the putout as the reference image of patching and interception in the end.

(6) patch up the 1:10 000 images that each division has involved by the homonymy element points of bordering images

(7) eliminate the patching-up lines at large by using the function of color-correct command and sampling of color and pattern in PhotoShop to reach the aim of no-slot patching; correct the image in whole or part by using PhotoShop's mighty color-correction function at the place of color disaccord resulted from different screen times between the bordering photos and of color inequality because of the effect of

cloud-shielding and others in the images to make the color of images patched uniform

(8) intercept the patched-up images in the end.

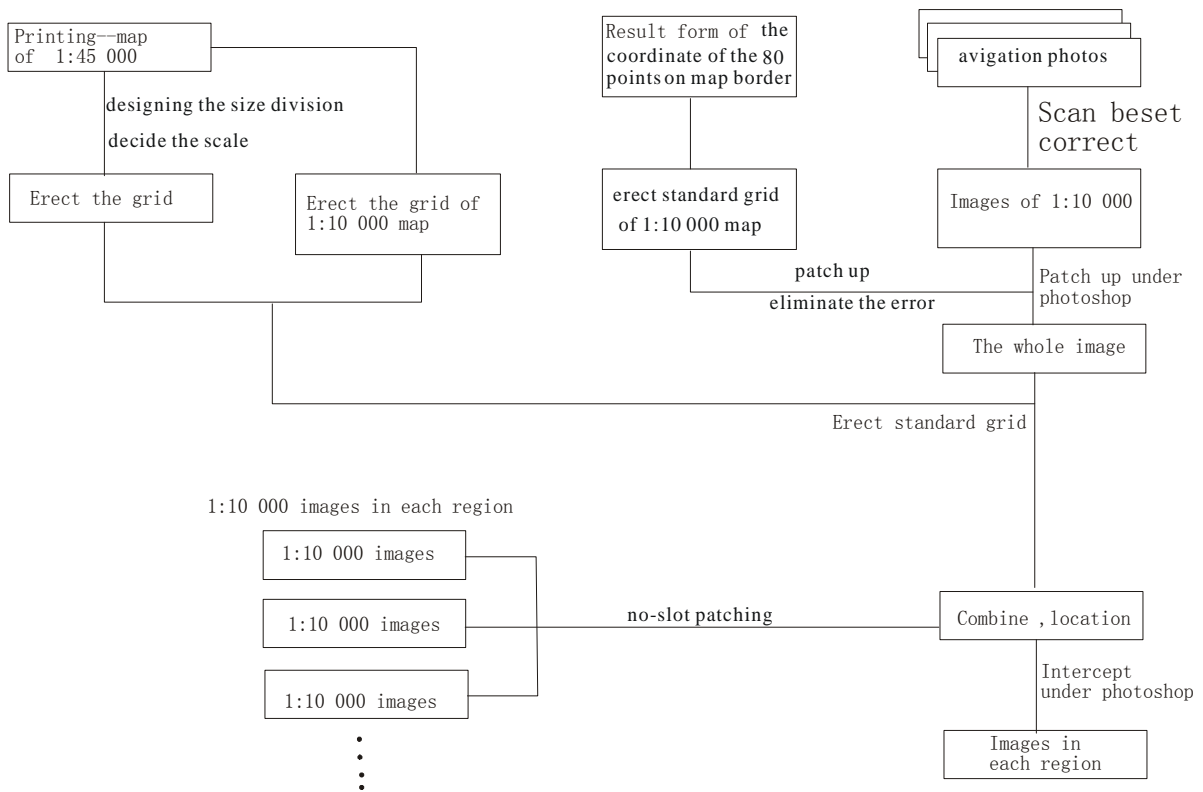The process can be sketched in Fig.1.

Fig.1

3. sign road grades and the labels of the needed placename in the corresponding scale map as the base of editing .

4. subdraw the district borderline on the element 1:10 000 images according as the 1:10 000 landscope fundamentally as the base of editing.

5. in the enviroment of CoreDraw, draw the elements of map by layer using the handled images as the base of drawing map, especially the bedding of road must be right, otherwise the shielding relations of the graded roads can not be shown correctly. It should scout along the centerline when drawing the roads and the location must be exact to obtain nature road-lines; draw the borderlines of each grades exactly according to the district borderlines of 1:10 000 landscope map; compile and treat the shields of buildings that have been covered by the roads, then remain these; remain the images of building while drawing the roads because the center projection formed by high buildings shields the roads.

6.take in the notes in the environment of CorelDraw.

7.the output of color proof.

8.the makeready and print.

III. the solutions of problems during investigating atlas

In the process of editing the city atlas based on aviation photos, the treatment is different from that of common ones. The treatments to several special conditions in the atlas are concluded.

1.Color treatment of aerial images

Color effect comes first when reading the atlas, therefore the design layer must vary distinctly to make the subject conspicuous and the color must be harmonious to attract readers to its contents. Considering the roads in the images are yellow and nacarat in the atlas, we modulate the color and appearance of the mapsheet to slight blue-green-gray so that the subject can be more conspicuous.

2.Color modulation of water in the images

The aviation photos used in editing the atlas are screened in November and December and the water in the images is very gray, too. What's more , the water is low and some rivers and lakes are dry ,which makes the images light and without contrast. After compared for several comparison experiments, the plane middle blue water is designed. Especially in the images of BANAN and LONGGANG , the large mountainous area, this kind of color design can active and set off the photo surface effect after the water range lines are outlined precisely by the brush-tool in PhotoShop. Then alternate the outline to selection region and do one–element eclosion to make the water range lines not rigid anymore. In the end, fill color $C_{60}M_{15}$ in the selection region.

3.treatment of secret factors

Because this atlas will be published open, the military establishments, forbidden zones and some sensitive things involved in the photos must be treated. The method is :first select an area which is similar to the region to be selected ,such as space, green land, country and street, then make eclosion at the edge of this area so that the surrounding have a nature transition and the secret aim can be reached.

4.Treatment of important buildings

Shenzhen is a newly built, modern and international metropolis, where the forest high buildings stand. How to make this time-breath reflected in the atlas, then? A special method has been used in the atlas: do treatment on the higher, handsome and famous buildings that have anchor functions so that they can be more conspicuous. The concrete process is: in the environment of PhotoShop, select the important buildings using "brush tool" and copy them onto another layer; then make seven-element eclosion on the selection region in the background layer followed by deleting the selected region, this can make the building take on a graded light-shielding effect; finally, in the copied selection region layer, reinforce the building color and sharp the edges. In order to enhance the solid effect, color correction must put into practice to the different sides of some buildings(see Fig.1). Because aviation photos are center projected, the directions of buildings in the same photo are different. For the important buildings which heads' directions are down should be treated after circumgyrated up.

5.Treatment of buildings covered by roads and their shields

There is no case of houses covering roads when the atlas is digital completely, because the house sign is planed and the floor height needs no description, that is it needs only color to describe the floor. However, the houses in the photos fluctuate beautifully reflects the real buildings' height variation, which results in the covering of roads by the high buildings for center projection. In order to keep the images of house still standing by the roads to correspond the reality, treatment can be implemented as following (Fig.2):
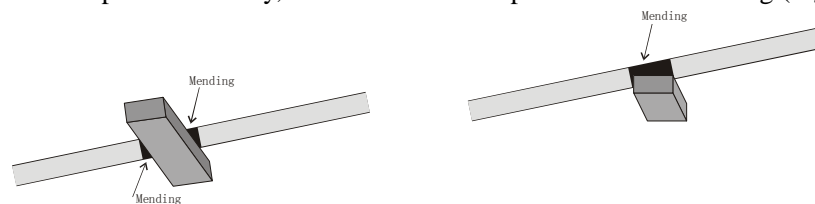

Fig.2

(draw the roads on the two sides of buildings and make some mending at the joints of buildings and roads in PhotoShop)

Another way is: select out the images of high buildings that have covered the roads and place it in another

layer in PhotoShop, then guide the layer to CorelDraw along and place it on the road layer.

Not only the images of buildings covered by the roads remain, but their shadows are shown. The pictures are more vivid and the third dimension enhances after the color is set K50 and transparency ratio is set 50% in the range of shadow by using "Lens-transparency" command on the road.

6.Treatment of roads and crossroads

As the modern metropolis, Shenzhen has mighty traffic network. Cartographic methods are used in the atlas, which reflects Shenzhen 's city development from the beginning of city building and the present traffic network. All the roads are the same width as that in the photos and shown in the form of cartographic signs, using colors of different brightness to distinct highways, freeways, common roads and paths. At the same time, the business booming regions are signed using special color to make the roads' network more clear and easy to be read. The crossways are the same as that in the photos and their directions and layer relations are shown exactly and in great details. Considered the atlas to be used by drivers, the lanes are signed along the roads, which makes the atlas more practical. (See Fig following)

7.The labeling means of   letterings,names and their signs

The geographical ground map with nature color photos is different from common ones. As their hues varies a lot, if the labels are pressed on it, it will be difficult to read because of the nature color. Therefore, 0.3mm white edges are added in the atlas, which makes the images beautiful and the labels clear even in the dimmest place. What's more, in the atlas point sites are signed at all locatable notes, and the gas station, parking lots, big shopping place, entertainment concourse and hotels are categorized by different colors and sign shapes, which makes the atlas more practical.

8.Special format designing

The format design is novel without limited in the traditional form. Its format is long 24K and full, that is, the images are bestrewed the whole format and the effective area is $298 \times 256mm$. The cartographic factors and lettering are added on the center images. For the parts outside the effective regions, the images are remained, but the definition is decreased to homochromy and the cartographic factors are not added. The atlas becomes more modern and artful after added image lapping zone, and the search of the bordering maps becomes more convenient too. There are unique arrowheads signing the page numbers of bordering maps at the periphery of the map range. This design is innovation and convenient

9.Output the color-correct sketch: output the completed color_carbon_sprayed mapsheet to solicit the Unit's suggestion to see whether the design of the atlas can satisfy the map-reader, user and ensuring_Unit. The checker corrects the contents of map and points out the error and omit. This correction should be repeated.

10. Sent the dealt data to the film output equipment to do patch-up-format output and get the four color-suspending net film. Then send it to the publishing company. Now the process is described as following.

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