

GENERATING OF MAPS IN 1:5000 RATIO SCALE WITH HIGH RESOLUTION SATELLITE DATA

KEY WORDS: Base maps, Remote Sensing, Ikonos, Satellite Imagery

CASE STUDY: Isfehan - Iran

1. Abstract

GENERATING OF MAPS IN 1:5000 RATIO SCALE WITH HIGH RESOLUTION SATELLITE

Ammar Ghannadi-Maragheh

No 209 – Iranshahr-e shomali St – Karaim khane zand St – Islamic Azad South University

E-mail: ammar_ghannadi2000@yahoo.com

KEY WORDS: Base Maps, Remote Sensing, IKONOS, Satellite Imagery

ABSTRACT: In recent decades, Remote Sensing data became one of the basic information for generating of base maps and different applications in geometrics. In fact, it provides very useful broad range of environmental applications such as surveying, agriculture, geography, metrology, hydrology, transportation, urban planning, and control analyzes, landscape planning and etc. Especially in order to generate base maps, the Satellites data has a great role and it is now widely applied on collecting and processing data. To reach to this purpose, it has been used IKONOS satellite imageries in IRAN.

IKONOS, the world's first commercial high-resolution imaging satellite, was successfully launched in September of 1999. From a 680 km sun synchronous orbit, the IKONOS satellite simultaneously collects 1- meter panchromatic and 4- meter multispectral images in 4 bands with 11- bit resolution. In fact, in this paper the maps in 1:5000 ratio scales had been generated from IKONOS satellite images.

The results have shown its capability in solving of generation base maps with IKONOS satellite data and we found that these data are very suitable for identification all of the features in the base maps in different categories.

2. Introduction

The use of High resolution satellite images (HRSI) at 1 meters and better geometrical resolution has become a source of ongoing discussions since a number of years. Especially, in order to produce large scales map, these satellite

imageries have a good potential and so the generation of base maps improve as well. In this investigation, we had been developed a method for generation of base maps in high scale such as 1: 5000 ratio scales. For this purpose, we had been the Ikonos satellite imageries because the capabilities of these images are very suitable.

3. Data set used

The case study for performing the suggested method to produce the base maps is located in Isfahan city of IRAN. The geographic extents for this area is:

Latitude from $32^{\circ}, 36'$ to $32^{\circ}, 40'$ and longitude is from $51^{\circ} 38'$ to $51^{\circ} 43'$.

The Ikonos satellite image of the case study is shown in figure 1.



Figure 1. The part of Ikonos satellite image

4. MAP DESIGN SOFTWARE

The Remote sensing systems describe the data collection about any objects on the ground. In fact, they are raster system which has a great role in acquisition and processing data, but in order to produce base maps in different scales, we must have design software in vector structure. The view of the cartographic vector software is shown in figure 2.

After providing the merge data, the format of satellite imageries is converted to "Geo-Tiff" format because this format is supported by map design software.

If we want to produce a map which we don't have any map in that area, we must have GCP points measured by GPS on the ground in order to orientation the merge data with the ground, else For updating the maps, we can use the older maps and get the GCP points from those maps.

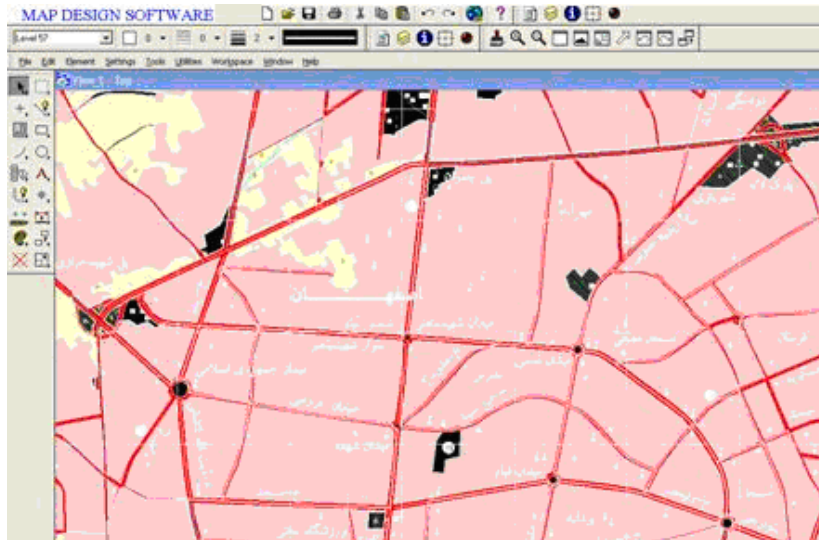


Figure 2, the view of the cartographic vector software

Also, all of the geographic objects available on base maps at the most common scales are available in our provided maps in 1/5000 ratio scale. These are in different types which shown in table 1.

Table 1. Geographic objects on our base maps

Type	Scale:1/5000
Communications	major roads and motorways, secondary roads, tracks, railways
Equipments topography	Power lines, Tunnels, Bridges, Sport fields Contours at 10 m major interval
Hydrology	Rivers and channels, Streams, Lakes and dams, Springs
Vegetation / land cover	Cultivated area, plantation, Grassland, Rocky areas
Artificial limits	Administrative boundaries, Cadastral boundaries and Several types of forest

The final provided map in 1: 5000 ratio scale is shown in figure 3.

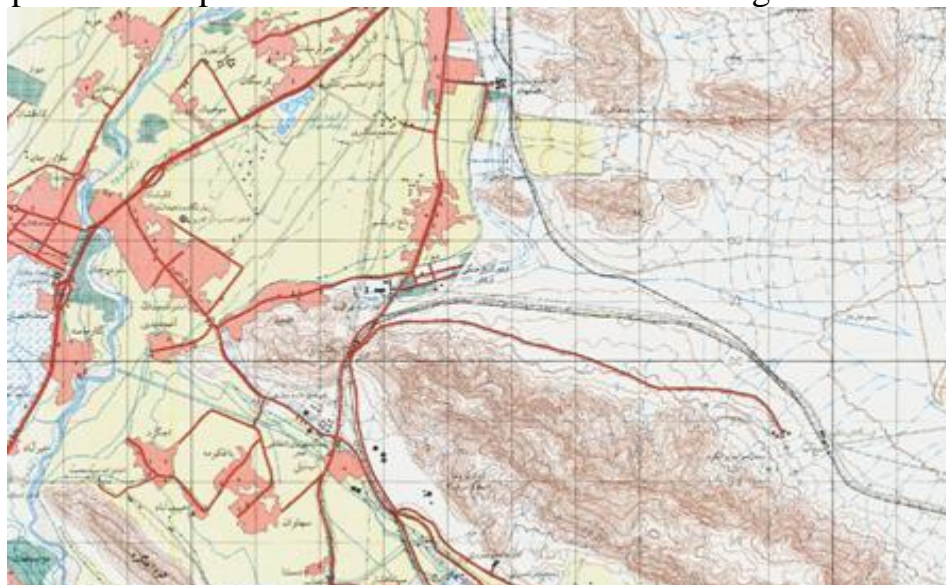


Figure 3. The final provided map in 1: 5000 ratio scale

5. CONCLUSION

In this investigation we had been developed a method for generating of base maps in 1: 5000 ratio scale with the IKONOS satellite imageries.

The result was shown that merging these data is very suitable for identification and delineation of linear and polygon features in city area and so, the level of classification improves as well. It is also found that more of the geographic features in a topographic base maps in difference categories such as Communications, Equipments, Hydrology, Vegetation, land use/ land cover and Artificial limits can be extracted from IKONOS satellite images. Also the horizontal and vertical accuracy was evaluated and we found with consideration GCP points on the IKONOS satellite images, the suitable accuracy for generation of base maps in 1: 5000 ratio scales was achieved, so use the more GCP points will not increase accuracy and just increase the processing time and lost money.

REFERENCES

1. Dowman, I., and Tao C.V., 2002. An update on the use of rational functions for Photogrammetric restitution, Highlights ISPRS, vol.7, No.3, pp.22-29.
2. Edward M., James B., McGlone J. C., Introduction to Modern Photogrammetry, Edition 2001, Jhon Wily & Sons (USA).
3. Fraser, C., 1999: Status of high-resolution satellite imaging. In Fritsch/Spiller (eds.). Photogrammetric Week '99, Wichmann Verlag, Heidelberg, pp. 117-123
4. Fritz, L., 1999: High resolution commercial remote sensing satellites and spatial information systems. ISPRS Highlights, Vol. 4, No. 2, June, pp. 19-30
5. Grodecki, J., Dial, G., 2003. Block Adjustment of High-Resolution Satellite Images Described by Rational Polynomials. *Photogrammetric Engineering & Remote Sensing*, Vol. 69, No. 1, January 2003, pp. 59-68.
6. Lutes J., 2006. First Impressions of CARTOSAT-1. In: *JACIE 2006 Civil Commercial Imagery Evaluation Workshop*, Laurel, Maryland, March 14-16, 2006.
7. Mikhail, E.M., Bethel, J.S. and McGlone, J.C., 2001, Introduction to modern Photogrammetry, John Wiley sons, New York.

8. Navalgund, R.R., 2005. CARTOSAT-1: The Latest from the Indian Remote Sensing Satellite Series. In: *ISPRS Highlights*, Vol. 10, No. 3, September 2005.