

# The comparative study of PKNU2 Image and Aerial photo & satellite image

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**Abstract:** Most research materials (data), which are used for the study of digital mapping and digital elevation model (DEM) in the field of Remote Sensing and Aerial Photogrammetry are aerial photographs and satellite images. Additionally, they are also used for National land mapping, National land management, environment management, military purposes, resource exploration and Earth surface analysis etc. Although aerial photographs have high resolution, the data, which they contain, are not used for environment exploration that requires continuous observation because of problems caused by its coastline, as well as single-spectral and long-term periodic image. In addition to this, they are difficult to interpret precisely because Satellite Images are influenced by atmospheric phenomena at the time of photographing, and have by far much lower resolution than existing aerial photographs, while they have a great practical usability because they are multispectral images. The PKNU 2 is an aerial photographing system that is made to compensate with the weak points of existing aerial photograph and satellite images. It is able to take pictures of very high resolution using a color digital camera with 6 million pixels and a color infrared camera, and can take perpendicular photographs because PKNU 2 system has equipment that makes the cameras stay level. Moreover, it is very cheap to take pictures by using super light aircraft as a platform. It has much higher resolution than existing aerial photographs and satellite images because it flies at a low altitude about 800m. The PKNU 2 can obtain multispectral images of visible to near infrared band so that it is good to manage environment and to make a classified diagram of vegetation.

**Keywords:** Aerial Photograph, Satellite Image, Calibration

## 1. Introduction

This study is for comparison PKNU 2, the digital multispectral aerial photographing system made in professor Chul-Uong, Choi's laboratory of Pukyong National University, with Satellite images and Analog aerial photographs.

## 2. Method

### 1) The study method and place

PKNU 2 images used in this study were taken in 28, December 2002. PKNU 2 aerial photographing system installed into the ultra light aircraft was taken pictures of areas of water system following the riverside. The light aircraft flew at a speed of 120~130km/h with an altitude of 700~800m. Gimbals were mounted into the lower part of aircraft. Power system and control equipment were installed into the inner part of aircraft to prevent from decreasing down the efficiency of battery caused by cold weather. Duplicate photographing by 2 times was performed to construct the strip. The comparative study of PKNU 2 images with satellite images and aerial photographs were accomplished that high ground resolution color images have more

**Table1. Photographing data for each image**

	Photographing Date	Number of images	Spatial resolution	Photographing area
PKNU2 images	1st: 2002.12.26 2nd: 2002.12.28	155 cut 155 cut	Less than 0.3m	A zone of Nakdong river Kyungan rivers
Aerial photos	1981 1988 1993 1995 1997 2000	103 cut 7 cut 82 cut 56 cut 6 cut 10 cut	1~0.6m	Kyungan rivers
Satellite images	Arirang Landsat IRS-1C IKONOS	12 cut 2 cut 2 cut 3/4 cut	6.6m 30m 5m 1m	Kyungan rivers A Nakdong river, Kyungan rivers A Nakdong river Kyungan rivers

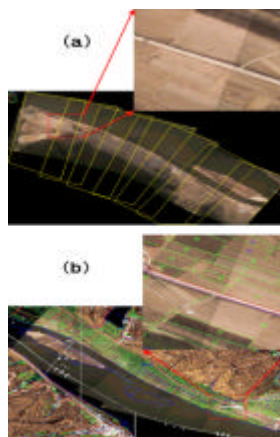
advantages than other satellite images and aerial photos. The comparison and analysis PKNU 2 images with satellite image and aerial photos after finishing with image processing. Images used in this study are shown in Table 1.

**2) Image processing**

Aerial photos are scanned as 1200dpi by scanner, types of Epson 12000, and input the data. Satellite images were processed by Image Analysis(IA) of Microstation. Aerial Photos were processed by Erdas imagine 8.4. GCPs(Ground Control Points) measurement for geometric rectification was performed by using GPS(Global Positioning System) and 1/5,000 land maps. DEM (Digital Elevation Model) was produced by using both of 1/25,000 and 1/5,000 land maps through Arcview and Microstation software. Lens distortion's correction of PKNU 2 images was performed to raise the accuracy of images.

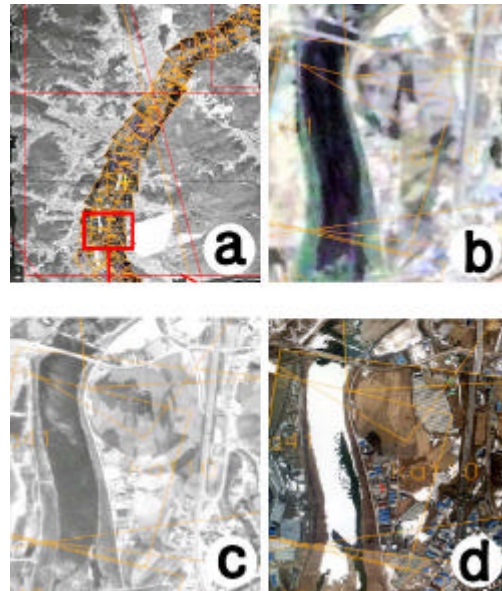
**4. Result**

**1) PKNU 2 images**



**Fig. 1. a) Construction of PKNU2 images' strip  
b) Comparison with digital map after rectification of lens distortion**

**2) PKNU 2 , Satellite images and Aerial photos**



**Fig.2. a) The photographing map of PKNU 2  
b) Satellite (Arirang, Landsat composition)  
c) 1/37,500 Aerial photos  
d) PKNU 2 images**

**5. Conclusions**

This study is for comparison PKNU 2 multispectral photographing system with existing Aerial photos and Satellite images. Results of comparison PKNU 2 with aerial photos from National Geographic Institute and satellite images of Arirang, Ikonos, IRS-1 and Landsat are that PKNU 2 images are cheaper than other images and high resolution of 0.29m with multispectral(R, G, B,IR) band while PKNU 2 images have a weak point of a limited photographing space. Therefore, PKNU 2 aerial photographing system is excellent in small areas and linear areas like roads and rivers while Satellite images are superior to analyze in wide areas.