

# AN INVENTED APPROACH IN IMAGE REGISTRATION “NEW ERA IN PHOTOGRAMMETRY”

A. Homainejad<sup>\*a</sup>

<sup>a</sup> Independent Research Group on Geospatial, Geospatial, No.  
18, 9th St. Mireamad Ave, Tehran, Islamic Republic of Iran

Technical Commission VII Symposium 2010

**KEY WORDS:** Digital Image, Laser Scanning, Transformation, Ortho-Image

## ABSTRACT:

Photogrammetry has been utilised as a remotely approach for obtaining the geometric elements of objects for decades; however, its main issues such as lens distortion reduce its reliability. In order to improve the reliability of a photogrammetric output, enormous approaches have been proposed and implemented, which most of them were focused on camera calibration and defining or establishing a mathematical relationship between the object space and image space, basically they succeeded in some extent. Besides of photography approach which is utilised in photogrammetry there are another imagery approaches such as thermal, radar, laser scanners, sonar, etc. which successfully have been implemented for remotely measuring geometric elements of objects. Another Imagery approaches have some advantages over photography such as imagery in any kind of atmospheric situation or imagery at day or night; however, the main advantage of photography over those approaches is to create a visible picture from objects that presents objects' details and background. There are various methods in photogrammetry and remote sensing which are combining different images which were acquired by different sensors from an object or acquired by a sensor in various times, for obtaining an output with higher accuracy. Those methods have utilised one of the transforming mathematical model according their application and accuracy, but the main issues which were mentioned above still remains in some extent in outputs. The main reason of remaining of distortion is mathematical model which is utilised in image transformation. In most of image registration approaches, mathematical model is proposed based on a three dimensional Cartesian space, but basically an image will be transformed from a 2D space to another 2D space. Indeed we are reducing the degree of freedom. This paper will discuss an invented approach which focuses on providing an output from registration of an aerial photograph on laser scanning data in order to omit mentioned issues and increase the reliability. In contrast other image registration methods which their outputs are an image, this approach is a 3D model which can be used for mapping, visualising, 3D GIS, ortho rectify image, and even camera calibration. The method is very versatile that can be utilised for registering any images on DTM, DMS, and topographic data. This approach for implementation does not require parameters of camera calibration and even is enabling to transfer a mono image to 3D model. For achieving higher accuracy and reliability combination of various images from an object such as aerial photographs and terrestrial photographs is applicable. In this paper the results of image registration from this approach will be assessed and analysed.

**TOPIC:** Data fusion and data assimilation

**ALTERNATIVE TOPIC:** Lidar and laser scanning