

# 全像立體地圖在空間深度判別之研究-以等高線圖為例

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## 摘 要

等高線地圖是最易判別地形高低的地圖，但相關研究中顯示等高線圖必須經由學習才能看的懂且並無適當的教學媒材及設備供學習，而早期傳統的地圖受限於紙上，必須將真實的世界以二維的方式來展示，現在如果透過全像立體影像的技術，便可將一般平面影像製作成三維立體影像，以便於做地形的立體觀察及地質判釋。而閱讀等高線圖首重要先了解地形與等高線圖的關係，其中包含坡形的變化及空間深度變化。本研究首次嘗試將全像立體影像運用於等高線地圖並做空間深度判別的研究，以一般人即可閱讀之等高線圖的四種基本坡形（均等坡、凹坡、凸坡、凹凸坡），以全像立體影像與平面影像為表現媒材，並在二維平面中表現三維立體概念的等高線圖做不同深度的改變，得到空間深度的執行規則。其研究結果提供未來製作出全像立體地圖之參考依據，除此之外還可運用到視覺設計領域中平面設計表現的新媒材，使表現更多元且富有變化。

(1) 不論是平面影像或全像立體影像呈現等高線圖時，在本實驗中均不因性別而影響其判讀的實驗結果。

(2) 等高線圖運用了全像立體影像輔媒材成像時，有助於等高線圖坡形的判別，也就是全像立體影像有助於深度的判別，以後可運用在視覺領域裡表現平面立體概念時或未來製作成全像地圖表現的參考依據。

(3) 等高線坡形的判讀上，全像立體影像優於平面影像，證明了全像立體影像能在平面中表現最佳的深度及立體效果。

(4) 全像立體影像對於變化愈大的等高線圖，在輔助受測者判讀的正確率上顯著性越高。

(5) 等高線圖不同的坡形不影響其空間深度的判別，也就是在模型製作上不需做任何

的更動，就可使真實空間中的模型與全像立體影像中所看到的模型相同，其結果可作為日後製作模型時之參考依據。

(6) 等高線圖不同的深度表現不影響其空間深度的判別，也就是全像立體影像與真實空間所呈現的空間深度是一致的，可運用在表現不同深度製作時之參考依據。

關鍵字：等高線；空間深度；地圖；立體影像；全像術

# The Depth of Spatial Research in the Holographic-Stereo Contour Map

## Abstract

The contour map is the easiest to distinguish the height of the terrain. According to the study, it demonstrated that the contour map has to be understudied by learning.

But there have not suitable teaching materials to supply learning. However, the conventional map is restricted on the paper; the real world must be displayed by using

the two-dimension. From this research, using the holography in order to get observe the terrain of stereoscopic vision and analyze the geology. To read the contour map, people must understand the relationship between the terrain and the contour map, including the change of gradient and depth of space. This is the first time to apply the complete and stereo image to the contour map and to discuss the depth of space. Four basic gradient of contour map will become the stimulus sample for this research which

are “equal slope, concave slope, convex slope and concave and convex slope. From the experiments three-dimensional of the contour map to make the different depth of change in the two-dimensional flat in order to get the rule of the depth of space. The result will provide to manufacture the depth of space map. Besides it, it is also a new teaching material to be applied in flat design of Communications Design. It has diversiform displays and rich changes. The result of the experiments are as below:

1. No matter the contour map is displayed by using the flat image or the complete and stereo image, sex has no effect on the result in this experiment.
2. Apply the complete and stereo image to the contour map. It can help to differentiate the slope of the contour map. On the other hand, the information and stereo image is helpful to

differentiate the depth. It will be a basis to display flat and stereo idea or manufacture the depth of spatial map in the future.

3. Participants differentiate the slope of the contour map, the complete and stereo image is better than the flat image. It proves that the complete and stereo image can display the best depth and the three-dimensional effect in the plane.

4. The participants differentiate the bigger change of the contour map more correct by using the complete and stereo image.

5. The slope of the contour map doesn't effect the differentiation of the depth of space. On the other hand, it doesn't need to make any change in manufacturing the models. It can make the models of the real space and the complete and stereo image same. The result can be a basic consultation as we manufacture the models in the future.

6. The depth of the contour map doesn't effect the differentiation of the depth of space. On the other hand, the depth of the complete and stereo image and the real space is the same. It can be a basic consultation as the researcher manufacturing the different depth.

Key words: Depth of space, Stereo image, Map, Holography ,Contour lines