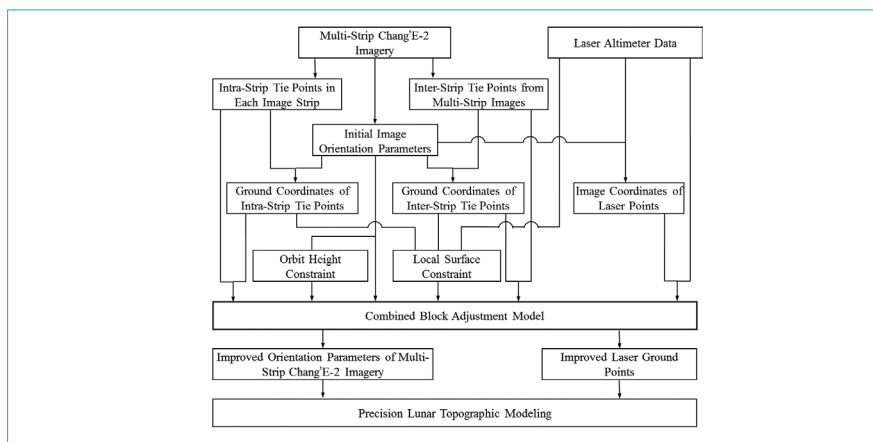


高精度地形測繪計算模型 Precise Topographic Mapping Model

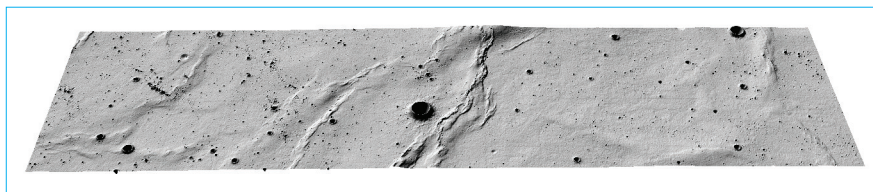
整合衛星相機影像與激光掃描數據以建立極高精準度的地形模型
Integrating data from satellite cameras and laser scanners for accurate mapping

這是一項成功整合衛星相機影像與激光掃描數據的星體地形地貌測繪技術。攝影測量測繪技術利用影像數據建立3D地形模型，它在水平方向的精度比垂直方向的為佳。相反，激光掃描在垂直方向的精度較佳。這兩種方法各自存在可高達數百米的誤差。結合兩種方法能夠消除數據中的誤差，取長補短，從而提高三維測繪產品在水平和垂直方向的精準度。

這項由理大研發的創新地形地貌繪測技術已應用於中國探月工程，協助測量與選取嫦娥三號著陸點。目前，該技術正應用中國後續探月任務的著陸點選取工作，以及建立香港的城市三維模型。



集成衛星影像與激光掃描數據的月球數據集成模型
Integration model of satellite imagery and laser scanning data for precision lunar mapping



利用數據集成模型所建立的月球三維地形模型
3D view of digital elevation model of the Moon by the integration model

This invention successfully integrates photogrammetry and laser measurement for mapping of celestial bodies. Photogrammetry is the science of making 3D models from photographs, which shows better accuracy in the horizontal direction than in the vertical direction. Laser measurement has better accuracy in the vertical direction than in the horizontal. Both methods may have errors of up to several hundred metres. Integrating data from these two sources can remove errors and improve the accuracy of mapping products in both horizontal and vertical directions.

The innovative mapping techniques developed by PolyU were deployed in the characterization and selection of the landing site for Chang'e-3 of China's lunar missions. The techniques are currently used to map the landing sites of China's future lunar missions and to produce accurate 3D city models in Hong Kong.

特色與優點

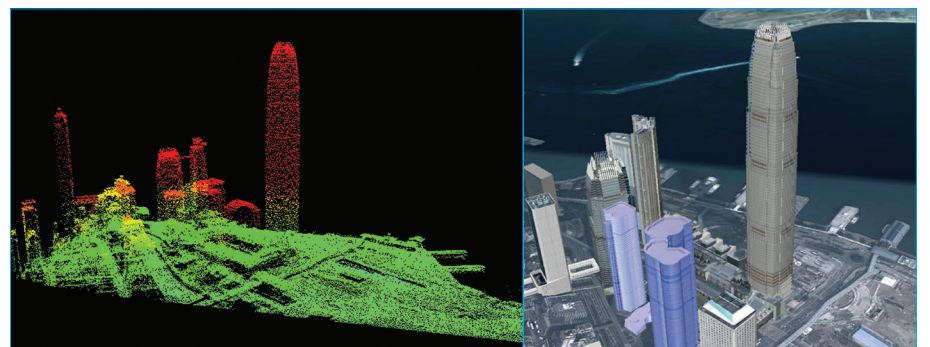
- 通過結合影像與激光掃描數據來消除數據中的誤差和提高三維測繪產品的精準度
- 這項研究對多源數據的比較、檢準與分析非常重要，能提高多源數據的協同利用的可行性

應用

- 太空探測任務(如中國嫦娥三號等)
- 基於衛星影像與激光掃描數據的城市地形測繪及三維建模，適用於智慧城市發展

獎項

- 第44屆瑞士日內瓦國際發明展 - 金獎 (2016年4月)
- 俄羅斯下諾夫哥羅德國立技術大學特別優異獎 (2016年4月)



利用數據集成模型所建立的城市地形及三維模型
Topographic mapping and 3D model of city by the integration model

Special Features and Advantages

- Integrating imagery and laser scanning data to remove data errors and improve accuracies of mapping products
- This development is essential for the proper calibration, registration, and analysis of the multi-source datasets. It makes the full comparative and synergistic use of multi-source datasets practical

Applications

- Celestial body mapping in space exploration missions (e.g. Chang'e-3)
- Topographic mapping and 3D modelling of cities from satellite imagery and laser scanning data for smart city development

Awards

- Gold Medal – 44th International Exhibition of Inventions of Geneva, Switzerland (April 2016)
- Special Merit Award from Nizhny Novgorod State Technical University, Russia (April 2016)

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