海水透視度調查

Survey of Seawater Transparency

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【摘要】

臺灣四周環海，海域範圍國土面積廣大，其中近岸（含潮間帶）為民生活動最頻繁且地形變動最為劇烈區域。有鑑於此，本局海洋測量課自 93 年度起積極辦理相關圖資測製，傳統地測與船載測深受限於地形與海象因素施測不易，為能快速獲取該區域圖資，有必要引進新技術來加速測量工作。而空載陸域光達與測深光達測量技術應用於近岸及潮間帶範圍地形測量似乎是一種可行方式。

空載光達是以航空器做為雷射掃瞄儀的載臺，結合雷射掃瞄系統、全球衛星定位系統(GPS)及慣性測量系統(IMU)，掃瞄測繪地表以獲取三維坐標，其中陸域光達可運用於測量退潮時露出水面部分之地形資料。臺灣近年已有 2 家民間公司引進，並已辦理相關測量工作。另測深光達可測量近岸區域清澈水域水下地形資料，惟因造價昂貴致臺灣目前尚無該設備，如要引進，則需詳細評估其經濟效益。

測深光達作業能力與水體透視度有關，海水透視度調查可藉沙奇盤(Secchi Disk)實地調查或以衛星影像(Satellite Image)進行判讀，藉相關調查數據分析測深光達可使用之區域以評估引進測深光達之可行性。本文將就海水透視度調查原理、不同作業方式介紹，並分析本局 95 年所辦理沙奇盤實地調查數據，提出初步建議供參考。

關鍵詞：海水透視度調查；沙奇盤；衛星影像

ABSTRACT

Inshore area around Taiwan is most frequently used for living activities and also acutely changed on terrain. Traditionally, it is difficult to survey in this area, especially at the tidal area, either ground surveying work or on boat sonar bathymetric devices. For quickly reaching the goal of completion of survey, newly developed technique was therefore introduced to overcome the difficulty. The air-borne LiDAR and bathmetry LiDAR indeed seems feasible for performing the surveying in this area.

Airborne LiDAR integrated with the laser scanning system, GPS and IMU are mounted on the aircraft to scan terrain surface to collect 3D coordinates. LiDAR can be put in use on the measure of tidal area terrain on the ebb. Bathymetric LiDAR has the ability to measure the underwater terrain in the near coast area while the water is

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clear. The capability of bathymetric LiDAR deeply depends upon the water transparency that can be investigated on the spot to obtain the ground truth with the device of Secchi Disk or analyses and interpretation from satellite images. Through analyses into the data collected from ground truth and estimated models from satellite images, the areas can be partitioned to arrange the adoption of using bathmetric LiDAR or other methods under the consideration of economic reasons. This article introduces seawater transparency investigation theory and its methods. An initiative proposition was also brought up for reference.

Keywords: Seawater Transparency Survey, Secchi Disk, Satellite Image