


【高教深耕微學分課程：無人機空拍與桃園海岸在地實踐】



學研博求永續發展
深耕二十再創高峰

| 水文與海洋科學研究所 X 近岸泥沙輸送實驗室 COAST

本實驗室其中一項研究儀器為無人機，在藻礁環境議題上，使用可見光攝影機的無人機，可以取得桃園海岸正射影像，探討季節性藻礁覆沙變化。無人機整合光達測距儀、姿態記錄器、衛星定位系統時，無人機光達系統可以提供公分等級測距資料，獲得精準地形高程並量化藻礁粗糙度，更能在海面量測獲得波浪資料，計算波浪能量消散與藻礁摩擦係數。透過無人機的應用，本實驗室能「快速」「精準」「有效率」地蒐集海岸研究資料。

另外，本實驗室提供微學分教學課程，讓大學部學生學習空拍基本操作，認識現行法規，並在桃園海岸空拍實作，認識桃園藻礁環境，展現對桃園海岸的保護與關懷。


The COAST research team has some equipment of Unmanned Aerial Vehicles. First, Camera-based UAVs can provide aerial images of Taoyuan coastline, which was used to analyze the seasonal sand coverage on algal reefs. Second, UAV-RTK-LIDAR System is a combination of LIDAR, GPS, and IMU. With this novel system, high accuracy topography data, e.g. roughness of algal reef, DSM, can be obtained. Furthermore, the system can measure the ocean waves in tidal zones, and quantify the wave energy dissipation on algal reef. Our team is capable to complete all the coastal research data fast, accurately, and efficiently.

The COAST research team also provides an undergraduate short course, which aims to give basic training on UAV operation, and gives the field trip practice in the Taoyuan coastline. UAV's regulations of nowadays are included in the course. The COAST research team dedicates to let more students be responsible to the Taoyuan coastline where they live.

無人機


UNMANNED AERIAL VEHICLES

無人機光達系統
UAV-RTK-LIDAR System



空拍機
Camera Drone

PHANTOM 4 PRO V2.0

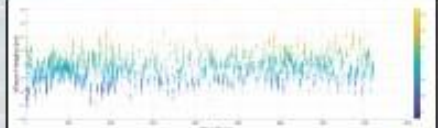


藻礁保護區歷史覆沙率變化

Observations of Variation of Sand Coverage

| 日期 | 覆沙率 | 日期 | 覆沙率 | 日期 | 覆沙率 | 日期 | 覆沙率 |
|------------|-----|------------|-----|------------|-----|------------|------|
| 2018.11.11 | 10% | 2018.11.11 | 15% | 2018.11.11 | 20% | 2018.11.11 | 25% |
| 2018.11.18 | 15% | 2018.11.18 | 20% | 2018.11.18 | 25% | 2018.11.18 | 30% |
| 2018.11.25 | 20% | 2018.11.25 | 25% | 2018.11.25 | 30% | 2018.11.25 | 35% |
| 2018.12.02 | 25% | 2018.12.02 | 30% | 2018.12.02 | 35% | 2018.12.02 | 40% |
| 2018.12.09 | 30% | 2018.12.09 | 35% | 2018.12.09 | 40% | 2018.12.09 | 45% |
| 2018.12.16 | 35% | 2018.12.16 | 40% | 2018.12.16 | 45% | 2018.12.16 | 50% |
| 2018.12.23 | 40% | 2018.12.23 | 45% | 2018.12.23 | 50% | 2018.12.23 | 55% |
| 2018.12.30 | 45% | 2018.12.30 | 50% | 2018.12.30 | 55% | 2018.12.30 | 60% |
| 2019.01.06 | 50% | 2019.01.06 | 55% | 2019.01.06 | 60% | 2019.01.06 | 65% |
| 2019.01.13 | 55% | 2019.01.13 | 60% | 2019.01.13 | 65% | 2019.01.13 | 70% |
| 2019.01.20 | 60% | 2019.01.20 | 65% | 2019.01.20 | 70% | 2019.01.20 | 75% |
| 2019.01.27 | 65% | 2019.01.27 | 70% | 2019.01.27 | 75% | 2019.01.27 | 80% |
| 2019.02.03 | 70% | 2019.02.03 | 75% | 2019.02.03 | 80% | 2019.02.03 | 85% |
| 2019.02.10 | 75% | 2019.02.10 | 80% | 2019.02.10 | 85% | 2019.02.10 | 90% |
| 2019.02.17 | 80% | 2019.02.17 | 85% | 2019.02.17 | 90% | 2019.02.17 | 95% |
| 2019.02.24 | 85% | 2019.02.24 | 90% | 2019.02.24 | 95% | 2019.02.24 | 100% |

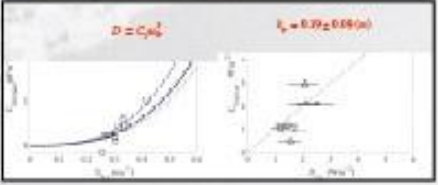
波浪量測 Measurements of Ocean Waves



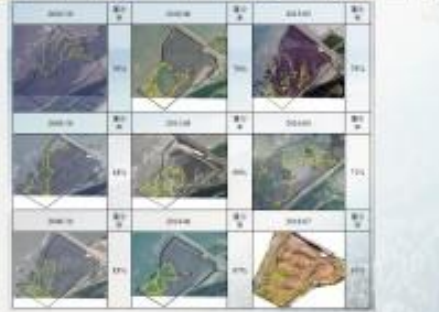
摩擦係數因子 Coefficient of Frictional Dissipation

$D = C_f \rho U^3$

$C_f = 0.79 \pm 0.09(\%)$




地形量測 Measurements of Algal Reef Topography




教育


EDUCATION



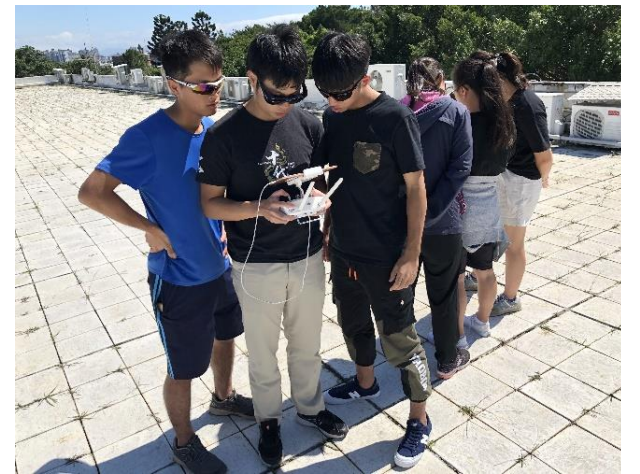
微學分
SHORT COURSE



觀新藻礁
GuanXin Algal Reef



大潭電廠
DaTan Power Plant



學生參與無人機微學分課程

