Aerial Photography 3D Surveying can predict streets prone to flooding by creating a 3D model using thousands of photos

Expert from Hong Kong: The error of the model is within centimeters.

The severe typhoon Hato has caused at least 10 deaths and more than 200 injuries in the wake of Macau, which creates the concern about the coastal city's disaster prevention capacity during typhoons or high tide.

With the rapid development of aerial photography technology in recent years, "three-dimensional (3D) surveying and analysis technology" has been developed in Hong Kong. Using large-scale aerial map and computer software SVL has formed a three-dimensional city model to assess cities such as Macau. Street flooding situation, the collapse of the trees after the flooding disaster or even the number of street garbage can be carefully calculated. Hong Kong aerial surveying experts said, "The water level and the flooding situation on each street with its corresponding street number, can be predicted."

Ming Pao reporter, Phyllis Tsang, entered the tidal data to calculate the water level rise. Lee Wei Pang, Land Surveyor, and Managing Director of Star Vision Co., Ltd., said that aerial photography has become mature in the past five years, we could use a large number of aerial photographs to form a three-dimensional model, and accurately record the natural appearance of buildings. With Satellite image analysis technology, and the input of different data, such as water level and other information, we can analyze and predict different scenarios. Related technology in recent years has been used for measurement, provide disaster relief, archaeological, site selection, property development and other projects.

Ming Pao newspaper shot hundreds of aerial photographs in Macau yesterday, including the boats that turned over in the Macau Qingzhou pond wharf after the typhoon, the garbage mountains in Patane North St., as well as the blasting of the glass window in the Travessa das Pedrinhas. Lee Wei Pang combined the photos taken by Ming Pao with his data collected in April in Macau, then analyze the post-disaster situation, create simulation maps and even count the relative number of garbage on the street . Mr. Lee said, "with the garbage mountains in Patane North St, we can see that there are at least 30 garbage bags. Also, some vehicles are turned over in the streets. I believe that the damaged vehicles were rushed by the water."

Mr. Lee said that if we input the tidal data it can estimate the height of the water level in Macao. For instance, during typhoon Hato someone was trapped in the underground parking which is in the main disaster area, R. de Joao de Araujo, and died during the flooding. From our model once the water level reaches 2.3 meters or above in R. de Joao

de Araujo there may be flooding. We can also use 3D model of R. de Joao de Araujo to simulate the flooding situation when the water level reaches 3 meters. "In other words, once we input a different water level, we can clearly show the flooding situation on the model and even predict the flooding situation on each street and its corresponding street number."

According to the Macau Meteorological and Geophysical Bureau, the "yellow storm surge warning" came into effect at 11 am today and the tidal water level in Macau reached 2.3 meters at 1pm. Apart from the prediction of flood, Mr. Lee said that the three-dimensional map can show and calculate the height and area of the dam and the condition of the buildings in the city. Also, he pointed out that the three-dimensional map shows an artificial island for the ongoing construction of the Hong Kong-Zhuhai-Macao Bridge to the east of the main Macao island. It is possible that the sand, will be blown by the wind from the artificial island to the buildings of the main island.

These information can be widely used in city planning and disaster prevention.
Mr. Lee said that the aerial photography three-dimensional measurement and analysis technology is not complicated. For example, in the range of 1 square kilometers, the aerial camera can capture 500 to 2000 overlapping photos and can be combined to create a three-dimensional model with high accuracy; error is within centimeters..

Lee Wei Pang has been a developer of the Innovation and Technology Commission's Innovation Technology Fund. He said that the technology was not widely used in Hong Kong but was applied by individual government departments or private organizations. Projects around the world have been using the technology for geo-information analysis, such as the expected impact of a tsunami. I believe that there is a future for aerial photography 3D surveying and analysis in city planning and disaster prevention and a wider range of applications.