

韌性 x 效率 x 水服務 - 跨域整合水資源物聯網

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摘要

臺灣面臨氣候變遷的衝擊，豐枯震盪加劇導致水旱災風險增加，且人口與產業朝都會地區集中，增加供水與排洪之壓力。面對未來挑戰，水利署結合前瞻科技創新思維與跨域整合資源技術，研發水資源智慧調控整體解決方案，重點摘述如下：

(1) 科技創新研發

1. 感測設備：研發低成本、低功耗、即時傳輸之物聯網感測設備。
2. 數位布建：在既有的水文觀測基礎布建數位設施，掌握水的來源與去向。
3. 雲端平臺：透過資通訊技術並統一傳輸規範，建立共通雲端水資訊匯流平台。

(2) 跨域技術整合

1. 資料整合：跨部會整合關鍵水情資訊。
2. 虛擬氣象站：結合衛星影像、實體測站觀測資料，運用影像融合、人工智慧等技術，產出逐時 1KM² 網格之水文氣象資料。
3. 預報精進與決策輔助：針對短中長期雨量、流量預報，搭配乾旱預警及人工智慧模式，建立區域水源調度與防洪運轉之人機協作模式。

(3) 水利服務應用

透過資料開放、程式開源、專利技轉，以及便利的水利服務等具體作為，活絡產官學研民之應用基礎。

綜上，以智慧水管理為核心，運用物聯網資通科技，掌握關鍵水情資訊，以韌性為導向、管理為手段，全面降低淹水、缺水及水利設施風險，提升政府施政及供用水效率，並帶動國內水利產業發展與整廠輸出，逐步實現安心用水、安全宜居及產業創新的幸福水環境。

Resilience x Efficiency x Water Service – Cross-domain integration water resource Internet of Things

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Abstract

Taiwan is facing the impact of climate change. It has increased the risk of floods and droughts. The concentration of population and industries in the metropolis has increased the pressure on water supply and flood discharge. In the face of future challenges, the WRA combines forward-looking technological innovation thinking with cross-domain integration of resource technologies to develop an overall solution for smart regulation of water resources. The key points are summarized as follows:

1. Technological Innovation Research and Development
 - (1) Sensors: Research and development IoT devices with low cost, low power and instantaneous transmission.
 - (2) Digital deployment: Deploy digital facilities on the existing hydrological observation base to realize the source and destination of water resource.
 - (3) Cloud Platform: Establish a cloud platform through information communication technology and unified transmission specifications.
2. Cross-Origin Resource Sharing Technology integration
 - (1) Data integration: Combine key water information from different departments.
 - (2) Virtual weather station: Combining satellite images and observation data from physical observation stations, using image fusion, artificial intelligence to produce hydrometeorological data.
 - (3) Forecasting improvement and decision support: For short, medium and long term rainfall and flow forecasts, combined with drought warning and artificial intelligence models. A human-machine collaboration model for regional water source dispatching and flood control operations is established.
3. Water service application

Through open data, open source programs, patent technology transfer, and convenient water services, the application foundation of production, government, education, research and civilian development will be activated.

In summary, using The IoT technology could master the key water information. This cloud improves government governance and water supply Efficiency, and promote the development of the domestic water industry. On the other hand, we could combine all the technology and output of the total solution other countries. It will gradually realize a happy water environment with safe water, and a safe and livable industrial innovation.