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Real-Time Web Map Service Based on Solar-Powered Unmanned Aerial Vehicle

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Abstract : The existing web map service providers contract with the satellite operators to update their maps by paying an astronomical amount of money, but the cost could be minimized by operating a cheap and small UAV. In contrast to the satellites, we only need to replace aged battery packs from time to time for the usage of UAVs. Utilizing both a regular camera and an infrared camera mounted on a small, solar-powered, long-endurance, and hoverable UAV, daytime ground surface photographs, and nighttime infrared photographs will be continuously and repeatedly uploaded to the web map server and overlapped with the existing ground surface photographs in real-time. The real-time web map service using a small, solar-powered, long-endurance, and hoverable UAV can also be applied to the surveillance missions, in particular, to detect border area intruders. The improved real-time image stitching algorithm is developed for the graphic map data overlapping. Also, a small home server will be developed to manage the huge size of incoming map data. The map photographs taken at tens or hundreds of kilometers by a UAV would improve the map graphic resolution compared to the map photographs taken at thousands of kilometers by satellites since the satellite photographs are limited by weather conditions.

Keywords : long-endurance, real-time web map service (RWMS), solar-powered, unmanned aerial vehicle (UAV)
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