

## Applications of Drones in Infrastructures: Challenges and Opportunities

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**Abstract :** Unmanned aerial vehicles (UAVs), also referred to as drones, equipped with various kinds of advanced detecting or surveying systems, are effective and low-cost in data acquisition, data delivery and sharing, which can benefit the building of infrastructures. This paper will give an overview of applications of drones in planning, designing, construction and maintenance of infrastructures. The drone platform, detecting and surveying systems, and post-data processing systems will be introduced, followed by cases with details of the applications. Challenges from different aspects will be addressed. Opportunities of drones in infrastructure include but not limited to the following. Firstly, UAVs equipped with high definition cameras or other detecting equipment are capable of inspecting the hard to reach infrastructure assets. Secondly, UAVs can be used as effective tools to survey and map the landscape to collect necessary information before infrastructure construction. Furthermore, an UAV or multi-UAVs are useful in construction management. UAVs can also be used in collecting roads and building information by taking high-resolution photos for future infrastructure planning. UAVs can be used to provide reliable and dynamic traffic information, which is potentially helpful in building smart cities. The main challenges are: limited flight time, the robustness of signal, post data analyze, multi-drone collaboration, weather condition, distractions to the traffic caused by drones. This paper aims to help owners, designers, engineers and architects to improve the building process of infrastructures for higher efficiency and better performance.

**Keywords :** bridge, construction, drones, infrastructure, information

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